FW20 file structure for Vogen

* Vogen can run several CLs for one aircraft configuration. Each “configuration” is defined by the input file name. Each CL calculation is named “case” and a consecutive number.
* Three levels of files are needed that hold the information for the (i) entire aircraft, each wing, and each spanwise strip. A possible, fourth level with each DVE information is desirable.
* Ideally the output file should have a techplot compatible format, which can also easily be used in Matlab or other plotting formats.

1. Configuration File “Config”

* Holds the aircraft configuration followed by the aircraft values of each “case”
* After a header, the file holds:
  + Reference length for rolling moment CL
  + Reference length for pitching moment CM
  + Reference length for yawing moment
  + Reference area
  + Projected planform area
  + Unraveled area
  + Reference span
  + Projected span
  + Reference aspect ratio
  + Number of wings
  + Number of cases (value “one” for now)
* Next the file holds the results for each “case”
  + Case #
  + Alpha [deg]
  + Beta [deg]
  + CL (lift)
  + CQ?? (Cside)
  + CDi
  + CL (Roll)
  + CM
  + CN

1. Wing information

* Separate file for each “case” with case number extension
* Each wing separately listed
* ht and vt are counted as separate tails (problem?)
* Start out with a header with
  + case number (to reference configuration and case conditions).
  + Number of wings
* For each wing (reference areas and lengths based on entire aircraft values):
  + CL (lift)
  + CQ (side)
  + CDi
  + CL (roll)
  + CM
  + CN

1. Spanwise information

* Separate file for each “case” with case number extension
* Needed for the calculation of profile drag and structural loads
* Start out with a header with
  + case number, number of spanwise strips
* for each spanwise strip
  + x\_ref
  + y\_ref
  + z\_ref
  + circulation at reference point (A\_te)
  + Cfx (body frame)
  + Cfy
  + Cfz
  + Cfn (magnitude, used to determine section lift coefficient for profile drag, should not include Cdi, not sure quite how)
  + Cmx (with respect to reference point and reference area and length)
  + Cmy (with respect to reference point and reference area and length)
  + Cmz (with respect to reference point and reference area and length)
  + Ref area
  + Ref. span
  + Ref. length
  + Ref. length for Cmx (2 eta?)
  + Ref. length for Cmy (2 xsi?)
  + Ref. length for Cmz (2 eta?)
  + x1 (left edge)
  + y1
  + z1
  + L1 (length of left edge)
  + x2 (right edge)
  + y2
  + z2
  + L2 (length of right edge)
  + circulation1
  + circulation2
  + Cn1 (force coefficient left edge, induced + free stream)
  + Cn0 (force coefficient middle, induced + free stream)
  + Cn2 (force coefficient ride edge, induced + free stream)
  + A\_te (redundant, but nevertheless)
  + B\_te
  + C\_te

1. DVE information

* Similar to timestep output
* Start out with a header with
  + case number, number of spanwise strips
* for each DVE
  + x
  + y
  + z
  + span or eta
  + chord or xsi
  + area
  + leading edge sweep
  + trailing edge sweep
  + alternatively to sweeps coordinates of corner points
  + A
  + B
  + C
  + Normal vector x
  + Normal vector y
  + Normal vector z
  + Force coefficients either in DVE ref. frame or cfx, cfy, cfz, (DVE area as reference)
  + Cfn (DVE area as reference)
  + Cm’s in same reference frame as cfs, reference, clearly indicate ref. lengths.