VECTO-CSE V2.0.2-beta6

Release Notes

2015-07-20

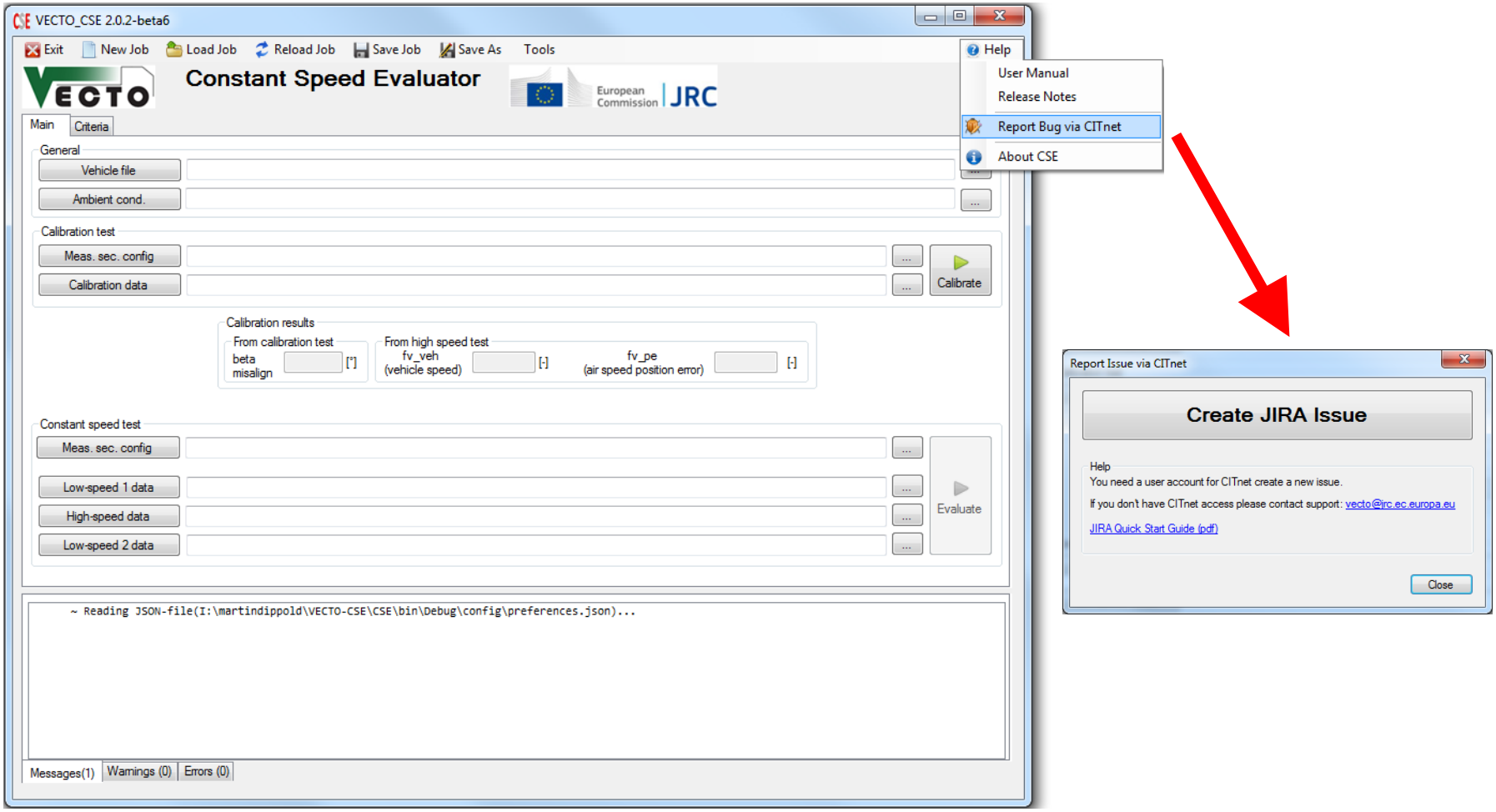
CSE Release updates

1. Bug report is suggested to be performed via CITnet. Instructions for this process are given in the “Help” menu point (details see next slide)
2. Rho_air_ref deleted from GUI and source code (no longer needed)
3. According to the outcome of the IPW study the input signal on tire temperature („<t_tire>“ in the *.csdat file) is not required anymore, but can be processed in CSE as an optional signal (like p_tire).
   - If the t_tire signal is detected the following values are calculated for each MS/DS and reported in the *_CSE.csv file

     t_tire_ave_LS_max
     t_tire_ave_LS_min
     t_tire_ave_HS_max
     t_tire_ave_HS_min

   - The validity criteria valid_t_tire value is deleted
4. For the pilot phase the measurement of the “ground temperature” is recommended. This quantity shall be added to the *.csdat file as an additional signal „t_ground “ . At the moment *.csdat applies no specific checks to this quantity.

Report Bug via CITnet



VECTO-CSE V2.0.2-beta5

Release Notes

2015-06-24

Overview updates compared to versions 2.0.1 (1/2)

ISSUE	Status	Comment
Update of calibration of vehicle speed and anemometer speed (high speed test instead of "calibration test")	Done	
Update of calculation of the CdxA value from measured drag forces	Done	some 1-2% different CdxA values calculated for test cases
Allow also non-continuous input data in *.csdat files	Done	
Update of generic data for cross wind dependency according to ACEA White book April 2015 (for tractor and semitrailer, new gen.shp file)	Done	
Update of criteria for stability of torque and vehicle speed according to ACEA White book April 2015	Done	
Update of definition of beta-signal in input data: old: 0° = air flow from front; new: 180° = air flow from front Output data: unchanged (0° = air flow from front)	Done	
Option in VECTO-CSE to read in cardan speed instead of engine speed and gear ratios for HS and LS Vehicle parameter "gear box type": MT_AMT --> n_eng is used; AT --> if n_eng is not specified n_card is used	Done	
Anemometer instrument calibration removed from CSE calculation quantities from csdat file read in to "_ic" values ("_ar" quantities deleted) f_aie etc. removed from GUI and from job-file	Done	
Default: Acceleration correction = on; averaging period = 1s	Done	Worse correlation of CdxA with beta in test cases
Introduction of stability / validity criteria for recorded engine speed (as a plausibility check for engine speed)	Done	Method to be discussed *

* See separate slides

Overview updates compared to versions 2.0.1 (2/2)

ISSUE	Status	Comment
Update of gradient correction: Handling of time steps where coordinates are constant over a certain time period (GPS accuracy issue) --> gradient set to 0 to avoid division by zero	Done	Not relevant for declaration
User-friendliness: set criteria to "standard" when CSE opens	Done	
User-friendliness: store information when switching between tabs	Done	
User-friendliness: non sensitivity to system regional settings (list separator etc.) (implemented via MS Excel tool)	Done	
User-friendliness: Add output for pass/fail criteria also for calibration run in the output file (MS_CAL) and in GUI	Done	
Direct start option implemented (VECTO-CSE now can be started from external scripts avoiding GUI operation)	Done	
Update of gradient correction: 2) Definition of altitude profile: suggestion Daimler: via Latitude and Longitude	open	Not relevant for declaration
Check / update of averaging of the beta angle within a dataset	waiting for ACEA decision	
Update of units for input of GPS data	waiting for ACEA decision	
Update of pass fail criteria based on tire temperature and tire pressure	waiting for IPW results	

Validity check for recorded engine speed

Criteria derived from stability criteria for vehicle speed

High speed test

Speed variation threshold [km/h]:

$$(v_{hms,avrg} - 0.3) \leq v_{hm,avrg} \leq (v_{hms,avrg} + 0.3)$$

where:

$v_{hms,avrg}$ = average of vehicle speed per measurement section [km/h]

$v_{hm,avrg}$ = 1 s moving average of vehicle speed [km/h]

1) Calculation of $r_{dyn,ref,HS}$ for all high speed measurement sections:

$$r_{dyn,ref,HS} = \frac{30 \cdot i_{gear} \cdot i_{axle} \cdot \frac{v_{hms,avrg}}{3.6}}{n_{eng,avrg} \cdot \pi}$$

2) Calculation of average $r_{dyn,ref,HS}$ from all valid high speed measurement sections

3) Check if 1s moving average of engine speed is within limits derived from vehicle speed criteria + tolerance (e.g. 1%)

$$\frac{30 \cdot i_{gear} \cdot i_{axle} \cdot \frac{(v_{hms,avrg} - 0.3)}{3.6}}{r_{dyn,ref,HS} \cdot \pi} \cdot (1 - 2\%) \leq n_{eng,1s} \leq \frac{30 \cdot i_{gear} \cdot i_{axle} \cdot \frac{(v_{hms,avrg} + 0.3)}{3.6}}{r_{dyn,ref,HS} \cdot \pi} \cdot (1 + 2\%)$$

New criteria: „delta_n_ec_HS“

Validity check for recorded engine speed

Criteria derived from stability criteria for vehicle speed

Low speed test

Speed variation threshold [km/h]:

$$(v_{lms,avrg} - 0.5) \leq v_{lm,avrg} \leq (v_{lms,avrg} + 0.5)$$

where:

$v_{lms,avrg}$	=	average of vehicle speed per measurement section [km/h]
$v_{lm,avrg}$	=	moving average of vehicle speed over a time needed to drive 25m [km/h]

1) Calculation of $r_{dyn,ref,LS}$ for all low speed measurement sections:

$$r_{dyn,ref,LS} = \frac{30 \cdot i_{gear} \cdot i_{axle} \cdot \frac{v_{lms,avrg}}{3.6}}{n_{eng,avrg} \cdot \pi}$$

2) Calculation of average $r_{dyn,ref,LS}$ from all valid low speed measurement sections

3) Check if „floating“ moving average of engine speed is within limits derived from vehicle speed criteria + tolerance (e.g. 1%)

$$\frac{30 \cdot i_{gear} \cdot i_{axle} \cdot \frac{(v_{lms,avrg} - 0.5)}{3.6}}{r_{dyn,ref,LS} \cdot \pi} \cdot (1 - 2\%) \leq n_{eng,float} \leq \frac{30 \cdot i_{gear} \cdot i_{axle} \cdot \frac{(v_{lms,avrg} + 0.5)}{3.6}}{r_{dyn,ref,LS} \cdot \pi} \cdot (1 + 2\%)$$

New criteria: „delta_n_ec_LS“

How to re-evaluate a data set from VECTO-CSE V2.0.1

1. Convert beta angle (column <beta> in *.csdat-files) to 180° = air flow from front
2. Amend vehicle file by gearbox_type „MT_AMT“ (see snapshop below)
3. Load all files into new VECTO-CSE Version and generate new job-file
   (Remark: Old criteria files no longer provided due to additional parameters)

```
{
  "Header": {
    "Title": "vecto-cse VEHICLE",
    "FileVersion": "1.0.0",
    "AppVersion": "2.0.1-pre1",
    "ModifiedDate": "2014/05/28 00:33:50 +02:00",
    "Strict": true,
    "BodySchema": null,
  },
  "Body": {
        "classCode":         4,
        "configuration":    "rigid",
        "vehWidth":         2.45,
        "vehHeight":        3.5,
        "anemometerHeight":  4.55,
        "testMass":         25000.0,
        "wheelsInertia":    90.0,
        "gearRatio_low":    2.5,
        "gearRatio_high":   1,
        "axleRatio":        3.6,
        "gearBox_type":     "MT_AMT",
   }
}
```

Updated output in VECTO-CSE main result file (*CSE.csv)

Update of output results provided per combination of measurement section and driving directions

quantity	unit	description
SecID	[-]	measurement section ID as specified in the *.csms-file
DirID	[-]	driving direction ID as specified in the *.csms-file
F0_singleMS	[N]	result for F0 from linear regression
F0_singleMS_LS1	[N]	result for F0 from linear regression (low speed data only from first test)
F0_singleMS_LS2	[N]	result for F0 from linear regression (low speed data only from second test)
CdxA(ß)	[m2]	CdxA (β) (= 2* ($F_{res,ref}$-F_0)/ (v_{air}^2 * rho_air)
CdxA0	[m2]	CdxA converted to zero cross-wind
delta_CdxA	[m2]	cross-wind correction
beta_abs_HS	[°]	average absolute beta from high speed dataset (0° refers to air flow from front!)
RRC_singleMS	[kg/t]	rolling resistance coefficient
RRC_singleMS_LS1	[kg/t]	rolling resistance coefficient (low speed data only from first test)
RRC_singleMS_LS2	[kg/t]	rolling resistance coefficient (low speed data only from second test)
Valid_RRC	[-]	Validity criteria for maximum difference of RRC from the two low speed runs passed (=1) or failed (=0)
t_tire_ave_LS_min	[°]	minimum tire temperature during low speed tests
t_tire_ave_LS_max	[°]	maximum tire temperature during low speed tests
t_tire_ave_HS_min	[°]	minimum tire temperature during high speed tests
t_tire_ave_HS_max	[°]	maximum tire temperature during high speed tests
F2_singleMS	[N/(m2/s2)]	result for F2 from linear regression
F2_singleMS_LS1	[N/(m2/s2)]	result for F2 from linear regression (low speed data only from first test)
F2_singleMS_LS2	[N/(m2/s2)]	result for F2 from linear regression (low speed data only from second test)

Overall output results (at the top of the *CSE.csv file) unchanged

Main issues to be analysed in beta testing

1. Change of CdxA result due to
   - Calibration of vehicle speed and air speed using the high speed test
   - Update of CdxA calculation
2. Influence of the acceleration correction
3. Is the validity check for engine speed passed

Preview MS Excel preprocessing tool

MS Excel pre-processing tool

- **Handling of input data from different sources**
  - Vehicle specifications
  - Definition of measurement sections
  - Recorded data during calibration test and LS/HS tests
- **Performs consistency checks between files (completeness of data, coordinates vs. lenghts of measurement sections etc.)**
- **Produces VECTO-CSE input files (independent from regional settings)**
- **Generates standard plots for basic checks**
- **User manual will be distributed beginning of July**
- **Use in later declaration not mandatory**

MS Excel pre-processing tool

Standard signal	Column identifier	Unit	Required	Calibration run	Low speed run 1	High speed run	Low speed run 2
time	<t>	[s] since day start	yes	available	available	available	available
(D)GPS latitude	<lat>	[mm.mm]	yes	available	available	available	available
(D)GPS longitude	<long>	[mm.mm]	yes	available	available	available	available
(D)GPS heading	<hdg>	[°]	yes	available	available	available	available
(D)GPS velocity	<v_veh_GPS>	[km/h]	yes	available	available	available	available
vehicle velocity	<v_veh_CAN>	[km/h]	yes	available	available	available	available
air speed	<v_air>	[m/s]	yes	available	available	available	available
inflow angle (beta)	<beta>	[°]	yes	available	available	available	available
engine speed	<n_eng>	[rpm]	yes	available	available	available	available
cardan speed	<n_card>	[rpm]	no				
torque meter (left wheel)	<tq_l>	[Nm]	yes	available	available	available	available
torque meter (right wheel)	<tq_r>	[Nm]	yes	available	available	available	available
ambient temperature on vehicl	<t_amb_veh>	[°C]	yes	available	available	available	available
trigger signal	<trigger>	[-]	no				
tyre temperature	<t_tire>	[°C]	yes	available	available	available	available
tyre pressure	<p_tire>	[bar]	no				
fuel mass flow	<fc>	[kg/h]	no				
validity	<valid>	[-]	no		available	available	available

Additional signals	Column identifier	Unit	Needed	Calibration run	Low speed run 1	High speed run	Low speed run 2
1	Satelites	[#]	no	available	available	available	available
2	<n_card1>	[rpm]	no	available	available	available	available

Check Data

Save Data

MS Excel pre-processing tool