Progress update on the EU MAC Pilot Programme
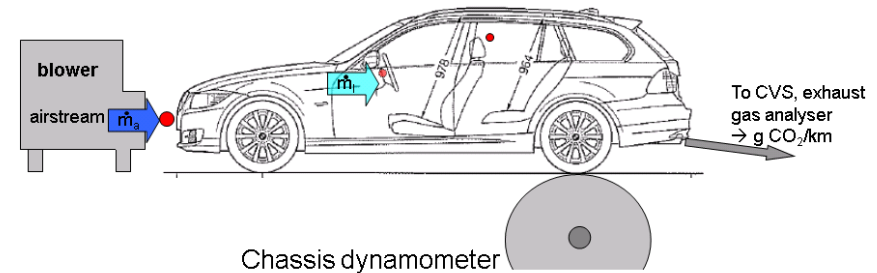
Informal meeting of MACTP working group at 65th GRPE

GRPE document number: GRPE-IG-MACTP-05-02
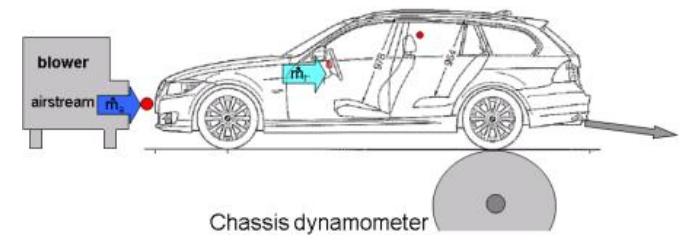

January 15th 2013
Geneva

By the Consortium of:
TUG: Stefan Hausberger
LAT: Savas Geivanidis, Zissis Samaras
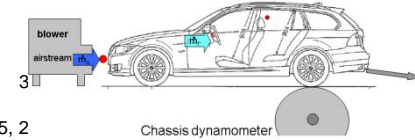TNO: Willar Vonk, Robin Vermeulen

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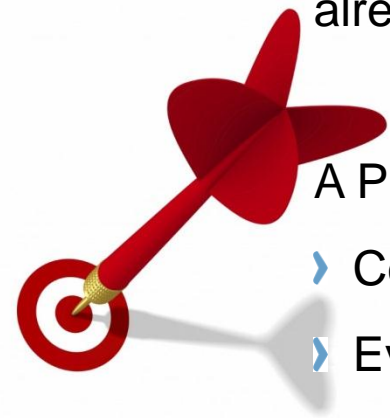> Outlook

Targets of the MAC Pilot Programme
→ Finalization of the draft procedure, evaluation of the procedure and drafting a technical annex to the Regulation

A draft type approval test procedure for MAC "energy efficiency" was already developed by the Consortium of TUG, LAT, KTI and TNO.
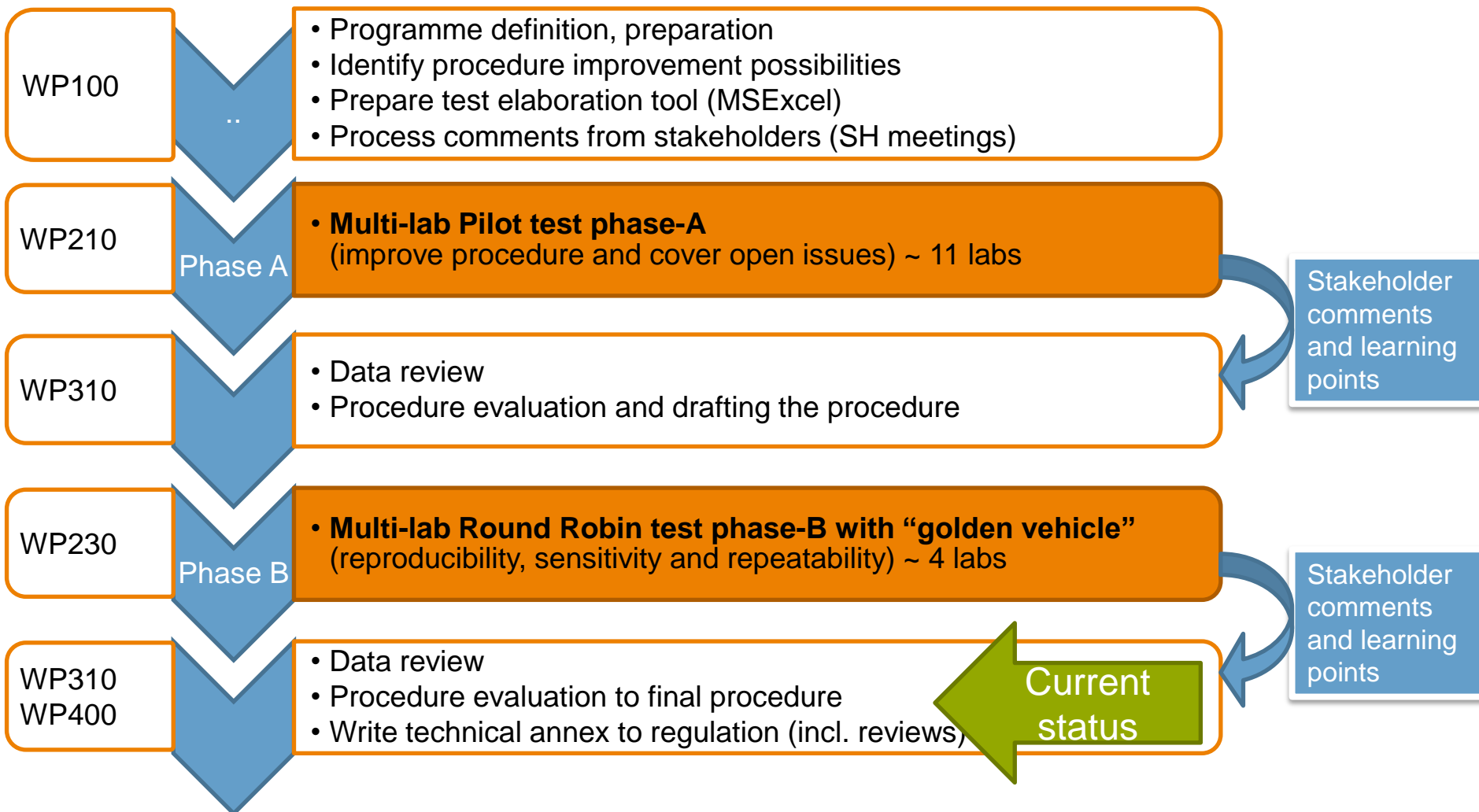
A Pilot Programme is defined to:

› Cover open issues and options for settings and data processing

› Evaluate the test procedure (Round Robin)

› Finalize the MAC test procedure and draft a technical annex to the Regulation

During Pilot Phase, labs also gain further experience with the procedure

MAC Pilot Test Programme contains two test phases:

| WP100 | .. | • Programme definition, preparation
• Identify procedure improvement possibilities
• Prepare test elaboration tool (MSExcel)
• Process comments from stakeholders (SH meetings) |

| WP210 | Phase A | • **Multi-lab Pilot test phase-A**
(improve procedure and cover open issues) ~ 11 labs |

Stakeholder comments and learning points

| WP310 | | • Data review
• Procedure evaluation and drafting the procedure |

| WP230 | Phase B | • **Multi-lab Round Robin test phase-B with "golden vehicle"**
(reproducibility, sensitivity and repeatability) ~ 4 labs |

Stakeholder comments and learning points

| WP310
WP400 | | • Data review
• Procedure evaluation to final procedure
• Write technical annex to regulation (incl. reviews) |

Current status

A bird's-eye view of the MAC test procedure (1/2)

(Status 15 January 2013)

❯ Emission test of the complete system of vehicle + MAC

❯ To be performed in an emission laboratory

❯ Driving the test vehicle on a chassis dynamometer

❯ Driving a driving cycle, preceded by a soak phase. The cycle has a phase for:

  ❯ Conditioning/ stabilization of the cabin temperature

  ❯ Three steady state situations with MAC on (idle, 50, 100km/h)

  ❯ The same three steady state situations with MAC off

❯ Ambient conditions are moderate (RH=45 ± 5% @ T_{AMB}=25 ± 2ºC)
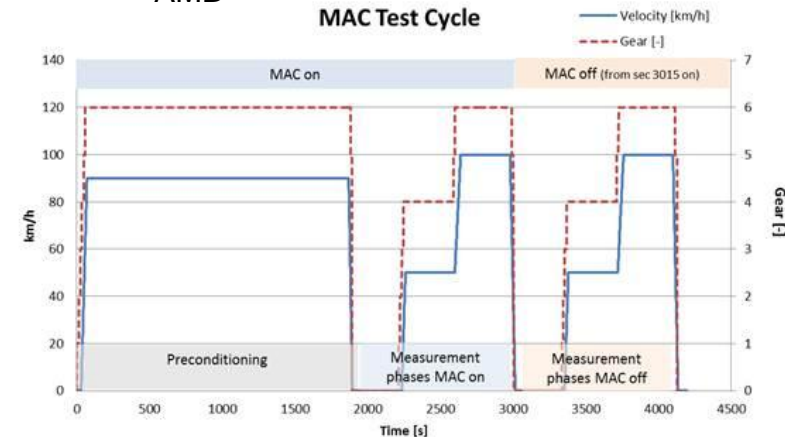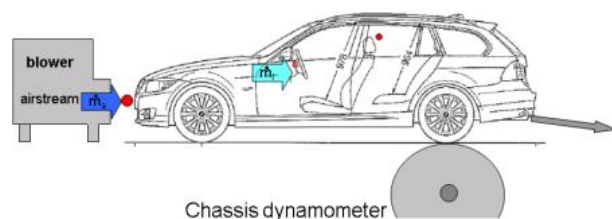
A bird's-eye view of the MAC test procedure (2/2)

(Status 15 January 2013)

› Correction functions for a range of variables to improve stability of the results or to minimize test burden

  › power correction (C_P)

  › ambient conditions (C_{COP})

  › cabin size (C_C) and glazing (F_{TTS})

  › electric energy misbalance (P_{EL})

› Feature check of MAC deactivation below 18ºC

› The MAC test results in the <u>additional fuel consumption </u>(delta FC_{MAC}), caused by the operation of the MAC. Additionally, the <u>additional CO_2 emission</u> (delta $CO_{2\,MAC}$) can be calculated.

Preliminary Results of the Round Robin

› In general the procedure is found to be robust

› Most sensitivities can be corrected for with correction functions

› Some items are still open and need discussion or further investigation:

 › Reproducibility (intra-lab variation) is not satisfying in some cases

  › a preliminary solution is to increase the number of tests to 3 to improve statistical variance

 › Family definition

 › Small list of test details

Outlook on activities
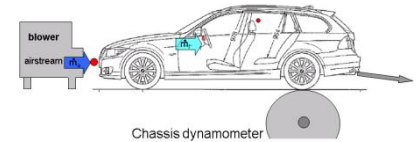
› Fine tuning of the procedure in close cooperation with the stakeholders

› Further data analyses of the dataset to investigate the possible cause of intra-lab variation of some tests

› Depending on the analyses possibly another small Round Robin to close remaining open issues

› Iteration meetings to develop and complete the technical annex, starting 29th of January 2013

Interim results, minutes and presentations on Circabc

FWD »
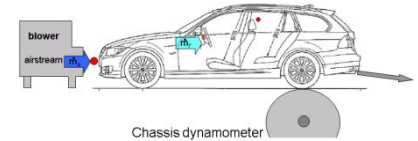
Thank you very much for your attention!

Do you have any questions?

Robin Vermeulen
robin.vermeulen@tno.nl
T +31 88 866 8424