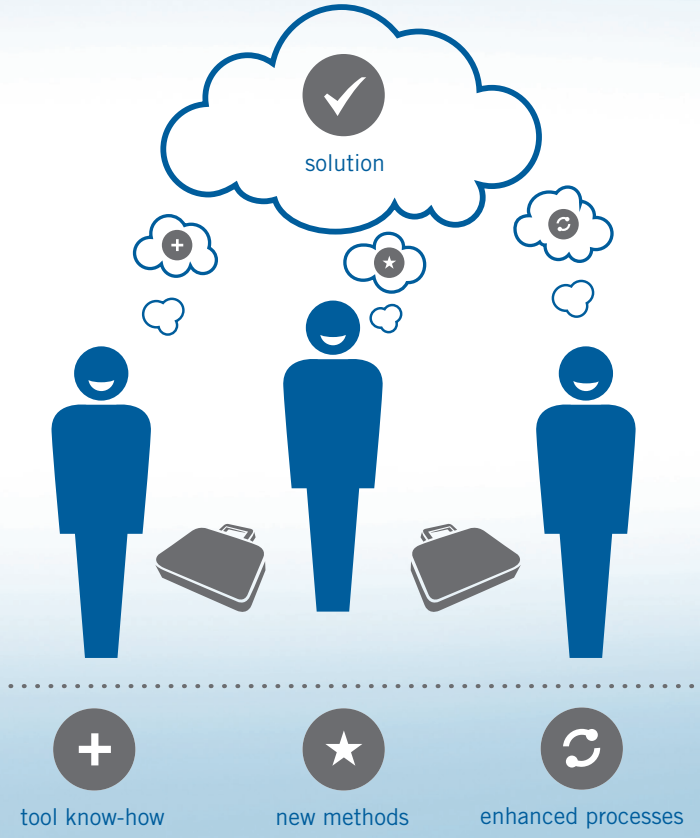

AVL Application Services

› CASE STUDY

Increased Testing Output and Transition from Test Facility Provider to Test Factory

@ Internationally operating OEMs

SUMMARY

Due to increased cost and time pressure OEMs must handle test facilities in powertrain testing as test factories.

This case study describes the optimization of testing done by AVL Application Services together with an internationally operating European OEM and includes all steps, from the evaluation of the status quo over proving possible gains in a pilot project to the final rollout in the OEM's organization.

CHALLENGE

OEMs can no longer afford to treat their test facilities the same way they have over the last 30 years. Modern powertrain test facilities need to be valued as test factories with high productivity as the main target, equalling maximum utilization with high quality data output. A prerequisite for operation optimization is that OEMs know where they are in terms of their testing productivity.

Fast Facts	
Customer / Department:	Internationally operating OEM, Testing Department
Region	Europe
Challenge	Increase testing output and support transition from test facility provider to test factory with high productivity as the main target
Solution	1. Analysis of status quo 2. Definition of clear measures based on KPI analysis 3. Implementation of changes supported by AVL Application Services
Duration	2–4 weeks, depending on request

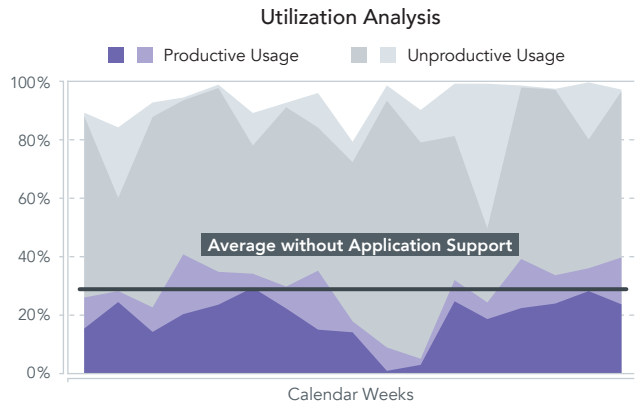

Figure 1

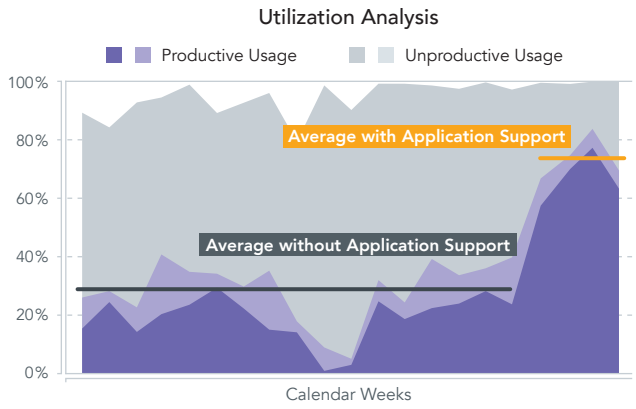

Figure 2

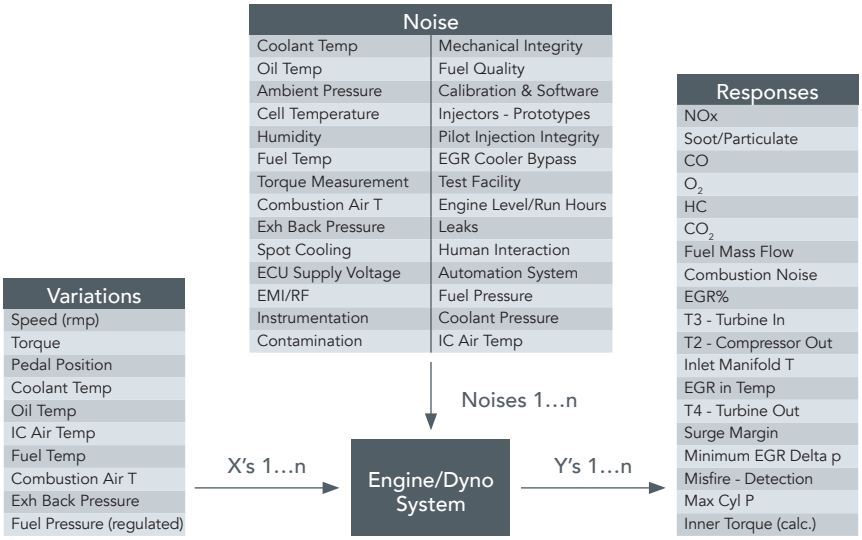

Figure 3

SOLUTION

1. Analysis of operations/current status

As a first step, AVL conducted a KPI assessment of the actual situation and working practices of the OEM, using the following main testing KPIs to evaluate the status quo of the OEM's testfield operation:

- Utilization
- Data quality
- Data collection rate
- Methodology/engineering approach

The KPI analysis was based on actual testbed data and observations made by experts on site. The analysis of the testbed data gave an objective view of the usage and performance of the facility, taking productive usage, data collection rate, raw data quality and applied testing strategies into account and putting them in relation to industry standards.

The actual OEM in this case study had a utilization of about 30% as seen in figure 1.

2. Definition of clear measures based on KPI analysis

Based on the evaluation of the KPIs, AVL defined the potential, corresponding strategies and new targets for improvement, including changes in terms of technology, new approaches in testing, organization, know-how profiles and responsibilities. In order to reach the newly agreed targets, the following improvement measures were determined:

a. Utilization

To improve the utilization, unmanned operation through state-of-the-art automation approaches were applied, including intelligent fail-safe methods to ensure first time through.
In addition, a high degree of standardization was used, which resulted in an increase of utilization by more than 100% as seen in figure 2.

b. Data quality

The main influencing factors for data quality, listed in figure 3 as Noise, were detected.
To achieve high data quality the system setup was optimized in regard to these specific noise factors. Moreover, measures for monitoring the quality of online and offline data were introduced.

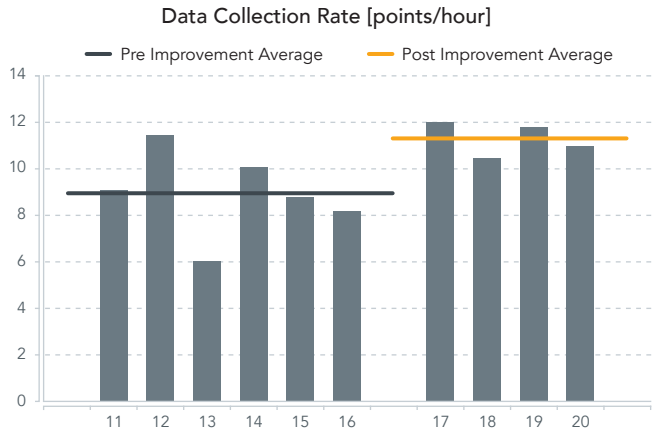

Figure 4

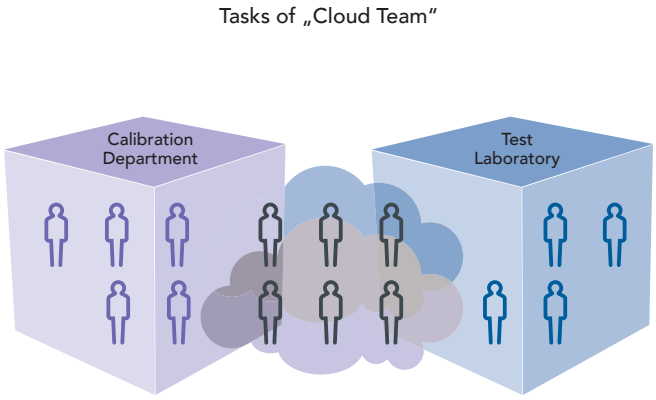

Figure 5

Engineering Support
Executing tests, evaluating and optimizing test results
Defining limits and adapting calibrations to be usable on a test cell
Automation Support
Using smart automation and introducing state of the art tools & methodologies (e.g. PUMA Open, CAMEO, DoE, Real Time Control)
Methodology Development
Developing and introducing new testing methodologies to improve the process of data gathering and evaluating. „Keeping up to date"
"Public Relations"
Convincing test field operations as well as calibration engineers to use new methodologies and tools
Ongoing Training

c. Data collection rate

Intelligent procedures to determine stability were applied and the test setup was optimized in regard to overall test time, e.g. with parallel actions for zeroing and purging of emission devices, improving the data collection rate by 20%. See figure 4.

d. Methodology/engineering approach

The existing testing and calibration methodology was taken into account and new approaches were applied to improve on this, e.g. Design of Experiment where applicable.

3. Implementation of changes

In the present, an optimal setup with regard to a central so-called "Cloud Team" (figure 5) with the responsibility for application of methodology and test automation was implemented. This included an improved organizational setup with respective roles and responsibilities in regard to efficient automation and model-based calibration. This step was guided and supported by AVL Application Services on site, e.g. by means of coaching and training of all people involved on all levels (from operator to management) and support in calibration projects at the testbeds.

RESULT

The transition of the OEM's testing department from facility provider to test factory showed the following overall improvements:

- Utilization: increase of productive runtime from 30% to over 70%
- Data quality: effort for high data quality reduced by 50% through automated quality tests and system optimization
- Data collection rate: improvement in data collection rate of 20%
- Improved methodology/engineering approach introduced to testing

OUTLOOK

In the present case study new approaches and organizational changes were introduced in a partnership between the OEM and AVL Application Services. As the outcome is not static – there still remains room for improvement and the work on the implementation of new methodologies for testing needs to be continued. AVL Application Services is a long-term partner in achieving these vital objectives.

FOR FURTHER INFORMATION PLEASE CONTACT:

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