



Front View Camera



Radar ECU



ADAS ECU



Instrument Cluster



Head Unit



Telematics ECU



ACDC Inverter



DCDC Converter



Onboard Charger



Headlight ECU

ECU COSTING

2021

Product Improvements

Dr. Hans Sporer – hsporer@a2mac1.com

Non contractual document

Latest document update – March 2021

2021 IMPROVEMENTS OVERVIEW

DATA CONTENT

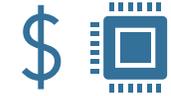
- Predictive Costing for next generation
- Detailed calculations on displays, power modules, etc.

VEHICLES SELECTION

- Analysis of 50 ECUs per year selected from multiple vehicles and markets (ECUs chosen in cutting-edge technologies & most interesting domains)

2021

2021 PRODUCT CONTENT



MAIN POINTS



COMPREHENSIVE

Get the most recent insights from the markets most innovative vehicles



SIMULATIVE

Cost simulation based on default standard parameters or with specific customized parameters



DETAILED

Access deep-dives for costings such as Lens-Modules and ECU-BOMs on semiconductor level



PREDICTIVE

Insights on cost-trends and market developments for main cost-drivers



CONCLUSIVE

Highlight reports and cost evaluation of selected modules, incl. costing of BOM and manufacturing process

SCOPE



Analysis of 50 ECUs per year (in cutting-edge technologies & most interesting domains)

ADAS:
3 ECUs / VH



Front View Camera



Radar ECU



ADAS ECU

INFOTAINMENT:
3 ECUs / VH



Instrument Cluster



Head Unit



Telematics ECU

E-POWERTRAIN:
3 ECUs / VH



ACDC Inverter



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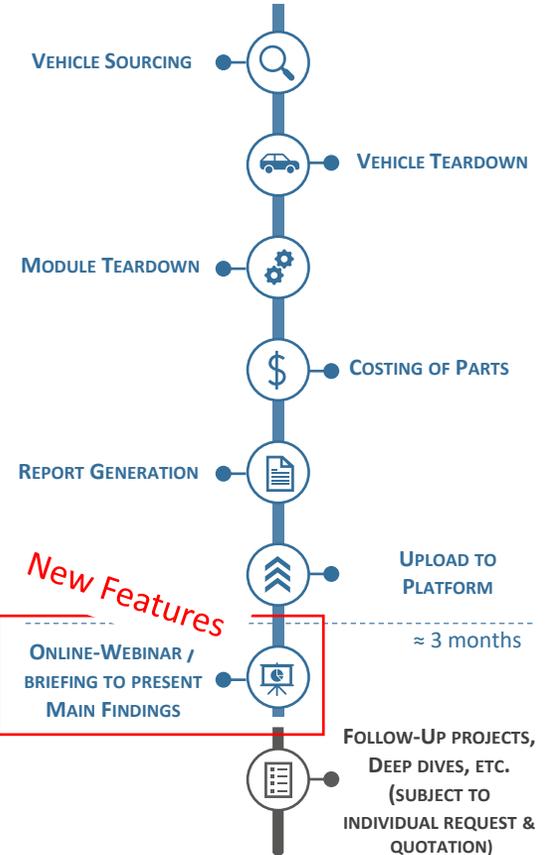
BODY:
1 ECU / VH



Headlight ECU

New from 2021:
Instead of selecting the ECUs from 5 vehicles, we enlarge the number of vehicles from which we are selecting the most relevant ECUs for each domain.

PROCESS



ECU Costing Delivery

1. Costing Template, Properties

Costing Information

Open Save Delete Auto Reload Copy Export to XLS Print view New window Settings

General Assumptions **Specific Assumptions**

Country: Germany Base currency: USD

Annual volume: 100000 Type of assumptions: Standard

Volume value must be between 5000 to 1000000

Properties BOM Process calc Functional Cost KPI

PROPERTY	UNIT	COST
BOM Cost		107.37
MOH		3.76
Material Cost		111.12
Production Cost		9.06
Manufacturing Cost		120.19
Overhead & Profit		24.04
Base Price		144.23

ADAS > Camera (Lane Assist)

By parts 21 result(s)

Product	Material Cost	Production Co.	Manufactur.	Overhead & P.	Base Price	Highlight Report
Audi A8 3.0 TFSI Quattro 2018	23.06	2.22	23.28	5.06	30.34	1035-1458_Camera_Lane_Assist.pdf
BMW 2 Series Active Tourer 218i 2014	9.68	2.75	12.43			
BMW 5 Series 530e Performance 2017	98.93	9.4	108.32	21.66	129.99	922-2164_Camera (Lane Assist) Highlight Report.pdf
Honda Civic 1.0 i-VTEC Executive 2017	74.27	7.45	81.72			
Hyundai Kona electric Executive 2018	85.21	5.13	90.34	18.07	108.41	1114-1238_Camera_Lane_Assist.pdf
Jaguar i-Pace EV 400 First Edition 2018	112.35	10.47	122.83	24.57	147.39	1079-134_Camera_Lane_Assist.pdf
Mazda 3 1.5 i-VTEC (A) 90i Performance 2014	11.84	4.74	16.62			

2. Highlight Reports

Electronics Costing Highlights

1927-1365 Camera (Lane Assist)

Functionality/Concept

- Mono Camera based with 2 Xilinx Zynq SoC
- enabled for Lateral safety ratings for Euro NCAP 2018 and Euro NCAP 2020
- Adaptive Cruise Control
- Child and Senior Detection
- Mobile, Pedestrian and Cyclist Detection
- Automatic Emergency Braking
- Front and Rear Vehicle Classification
- Worldwide Traffic Sign Detection
- Road Edge Detection
- Lane Departure Warning
- Lane Keep Assist
- Traffic Light Detection
- First-Side Detection
- Lane Detection and Road Boundary Object Detection

Key Performance Indicators

Performance Indicator	Specification / unit	Value
No. of Components	2147	573
Test points	0	0
Test point tests	0	0
Connectors	0	0
Mechanics	8 Pins	155
Screens	0	0

Mechanical Design

Item	Comment
Housing	<ul style="list-style-type: none"> • Aluminium die casting, with black powder coating • Dispersed thermal paste
Optic Module	<ul style="list-style-type: none"> • Optical module with glass lenses and Aluminium die casting • Optical module is glued (and calibrated) on image sensor PCB
Construction	<ul style="list-style-type: none"> • PCB support and optical module are screwed to

Technology - Cost Performance

Manufacturing Cost vs Feature / Technical Performance

Value 500 (2017)

Specific Camera, Audi A8 (2018)

BMW 3 Series Performance (2017) Mercedes EQC (2018) Polestar2 (2018) VW Golf GTI (2018) Mercedes A-Class (2018) Mercedes A-Class (2018) Mercedes A-Class (2018) Mercedes A-Class (2018)



- Dynamic, configurable
- Excel export
- Properties to enable compare

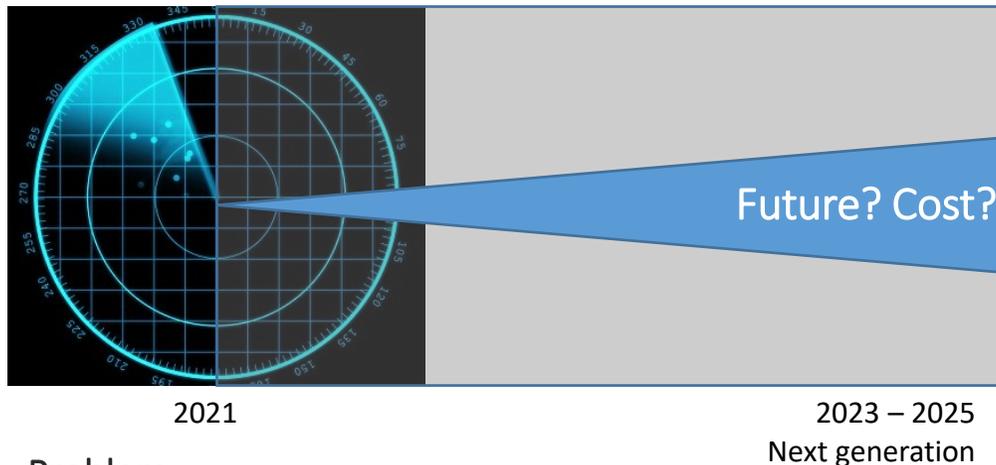
- Summary of cost, KPIs
- Technical / Cost Highlights
- Function/Cost Matrix

- New for Programme 2021
- Short presentations for each ECU

2021 Improvements - Predictive Costing for next Generation

The **PROBLEM / CHALLENGE** to get future with past solutions

Benchmarking: technical / costing radar



Problem:

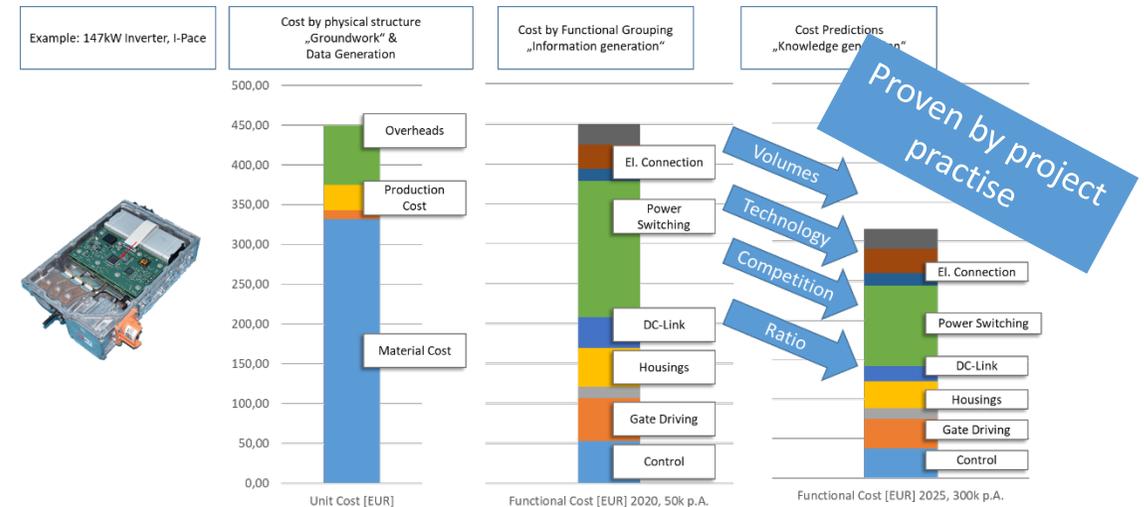
- based on old / past concepts
- Electronics: innovation & dynamics

Challenge

- What do tomorrow's solutions look like?
- What are their cost?

PREDICTIVE COSTING to simulate ECU cost for future / next generation

Cost Simulation: Future Cost Target

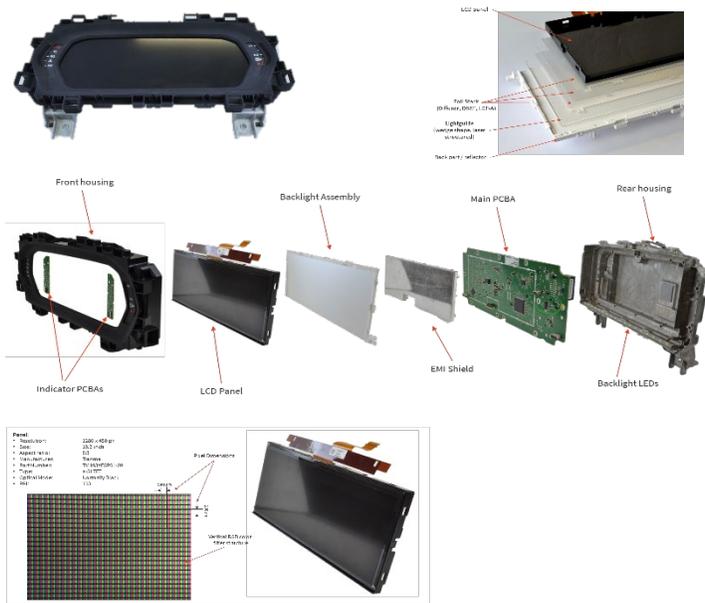


Based on current solution / cost structure

- Technological effects (innovation, integration)
- Volume effects / expected growth rates [economies-of-scale]

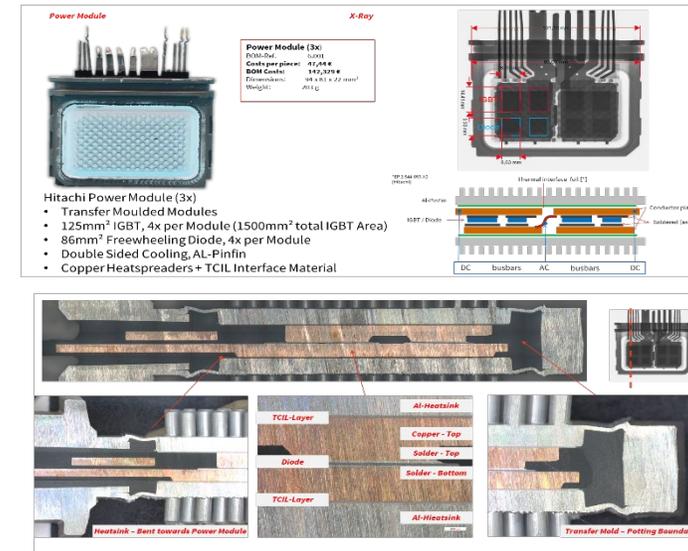
2021 Improvements - Further Cost-Break-Downs [CBD]

1 DISPLAY COSTING is a major focus for OEMs and OES due to value / innovation



- Tear-down
- Display BOM
- Detailed costing

2 A-PARTS CBD – POWER MODULE - is required to assess concept / technology



- Tear-down
- X-Ray, micro-graph analysis
- Detailed costing