HOMOLOGATION

One trike. Three markets. One plan.

Four weeks of buffer, and where they went.



HOW MANY TEST VEHICLES?
38 CHANGES, ONE COUNTS
ONE DECIBEL TOO LOUD

*AI-GENERATED IMAGE

ABOUT THIS MAGAZINE

XR 01 is a fictional vehicle. All programmes, dates and values in this magazine are synthetic and come from XORPunkt. The images are AI-generated, the AI assessments are simulated. No live AI system, no customer reference. The XORPunkt interface shown is in German.

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The four chapters first appeared as a series on LinkedIn.

A homologation, planned in public

A fictional hydrogen trike, three markets, one market launch. Four chapters, from the concept in October 2026 to the handover to the technical service in July 2027.

1 **The concept** — Is that a trike? — 3

2 **The test vehicles** — How many does the plan need? — 7

3 **The software update** — 38 changes. Which one counts? — 15

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What it means — For your programme — 27

Every figure in this magazine comes from XORPunkt and was recalculated with every change.

EDITORIAL

XR 01 will never hit the road

It doesn’t have to. We invented it for one reason: to show what it really takes to get a vehicle approved in three markets.

A vehicle without precedent is a good test. Hydrogen, combustion and three wheels each exist on their own, but hardly ever together. For the EU, XR 01 is an L5e-A tricycle; for Great Britain, a procedure of its own; for the US, a self-certified autocycle.

We planned the homologation in XORPunkt and played through what happens in a real programme: the question of test vehicles, which brought four weeks of buffer, then a software release and a test that fails by one decibel. Neither event was a crisis. Together they used up three of the four weeks.

The four chapters first appeared as a series on LinkedIn. Here they appear in the order in which they happen in the programme.

The hard part was never the vehicle. It’s the plan.

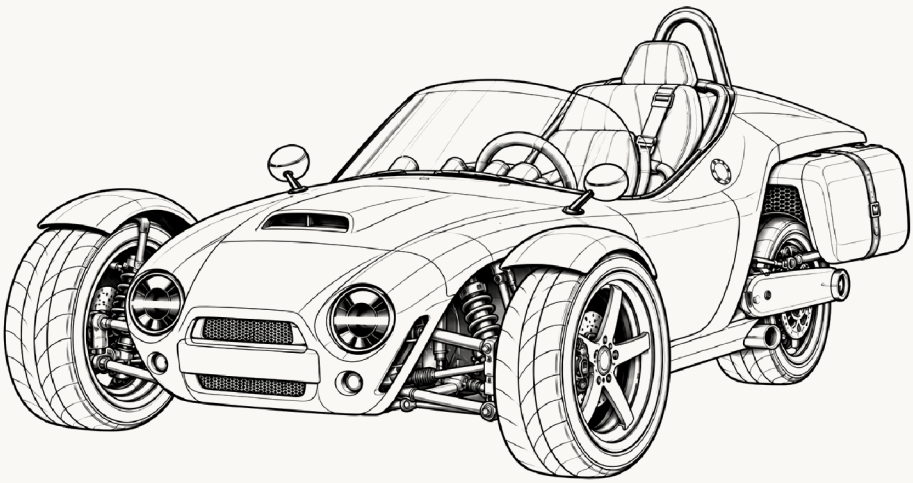
Lorant Zambori, Andreas Lange · XOR Digital

CHAPTER 1

1

The concept

Is that a trike?



*AI-GENERATED SKETCH

Small, light, hydrogen

Two seats in tandem, two wheels at the front, one at the rear. Powered by a combustion engine that burns hydrogen, or e-fuel in the second variant.



*AI-GENERATED IMAGE

MASS	480 kg ready to drive
ENGINE	2 cylinders, 850 cm^3, 45 kW
TOP SPEED	130 km/h
STORAGE	hydrogen, 350 bar
VARIANTS	H2 combustion and e-fuel petrol
ORIGIN	configuration (PLM), on every field in XORPunkt

Three legal identities

One vehicle, three rulebooks. Which tests apply depends on what XR 01 counts as in each market.

EU	L5e-A tricycle, type approval
UK	own approval, accepts EU reports
US	autocycle, self-certified by the manufacturer



What it would take

Two variants in three markets make six approval cases, each with its own date. For the EU alone, 32 regulations apply, from which the rules derive 20 pieces of evidence.

	EU · 10/27	UK · 12/27	US · 03/28
Hydrogen	APPROVAL CASE **H2 · EU**	APPROVAL CASE **H2 · UK**	APPROVAL CASE **H2 · US**
E-fuel	APPROVAL CASE **E-fuel · EU**	APPROVAL CASE **E-fuel · UK**	APPROVAL CASE **E-fuel · US**

Six approval cases, one per variant and target market. Above each column, the market launch.

?

Test vehicles

How many vehicles carry the tests is the question the date depends on. Chapter 2.



CHAPTER 2

2

The test vehicles

How many vehicles does the plan need?

*AI-GENERATED IMAGE



Every test needs a vehicle

Markets and regulations decide which tests XR 01 needs. Nobody decides how many vehicles carry them. The plan has to answer that.

Each test runs on a test vehicle, one after the other, in a slot at the technical service. Between two tests the vehicle is refitted, and if the next slot is taken, the vehicle waits.

7	tests per vehicle, one after the other
3,500 km	of run-in before the first test
10 weeks	of durability driving, on a vehicle of its own or after the tests
3 August	the last test must be done, so that report, submission and approval fit before launch

16 weeks before a vehicle exists

The test vehicles for XR 01 are ordered on 30 October 2026 and delivered on 19 February 2027. So their number has to be fixed before a single one exists.



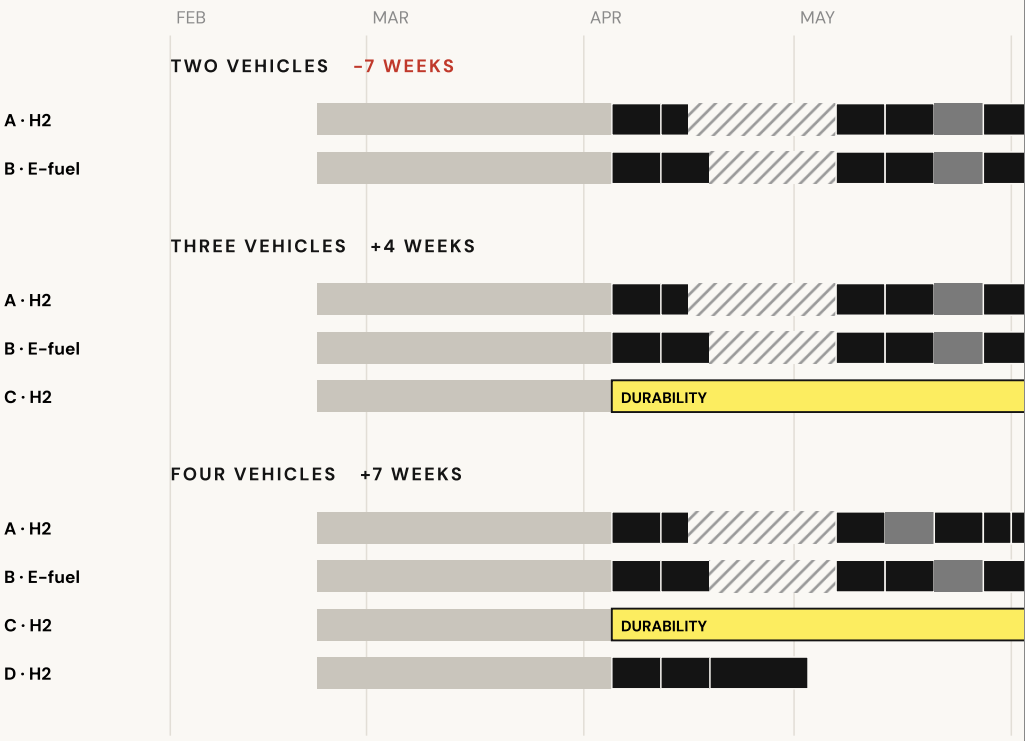
Order too few and you find out in summer, when the tests no longer fit the time. Order too many and you pay for vehicles that gain you nothing. The answer lies in the sequence of tests on each vehicle, and XORPunkt calculates it before anything is ordered.

The most important decision is made before a vehicle exists.



Two, three or four

The same tests on two, three or four vehicles. In each case the scheduler fits them into the slots again and calculates the buffer to market launch.

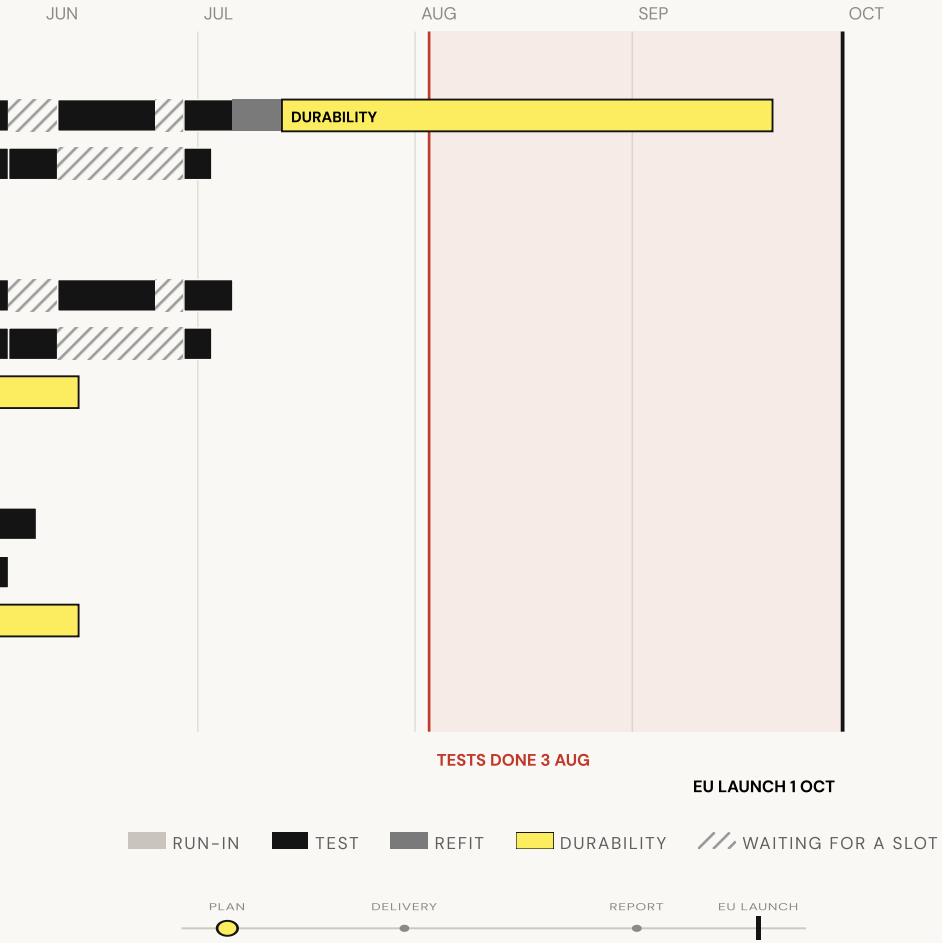


HOW TO READ IT

Each row is a vehicle, from delivery in February to its last test. Black are tests, hatched is waiting for a slot, yellow is the durability run.

THE RED LINE

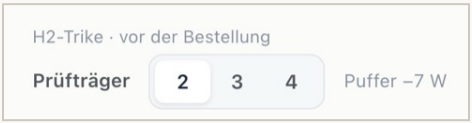
Everything has to be done by 3 August. Whatever runs past it costs the launch. With two vehicles, the durability run overshoots by seven weeks.



One click instead of replanning by hand

In the planning view, the number of test vehicles is a control as long as nothing is ordered. Each click recalculates all six approval cases.

THE CONTROL



Number of test vehicles for the H2 trike, next to it the smallest buffer. Here two are selected, at −7 weeks.

THE HEADLINE WITH TWO VEHICLES



5 of 6 approval cases hold their market launch. EU misses it by seven weeks.

THE HEADLINE WITH THREE VEHICLES



6 of 6 approval cases hold their market launch, the tightest with four weeks of buffer.

Next to it is a second programme, the H2 roadster. It shares slots at the technical service with XR 01. Interface in German.

Ordered: three test vehicles

Buffer to EU launch, depending on how many vehicles carry the tests.

2 VEHICLES	3 VEHICLES	4 VEHICLES
−7	+4	+7
WEEKS LATE	WEEKS BUFFER · ORDERED	WEEKS BUFFER

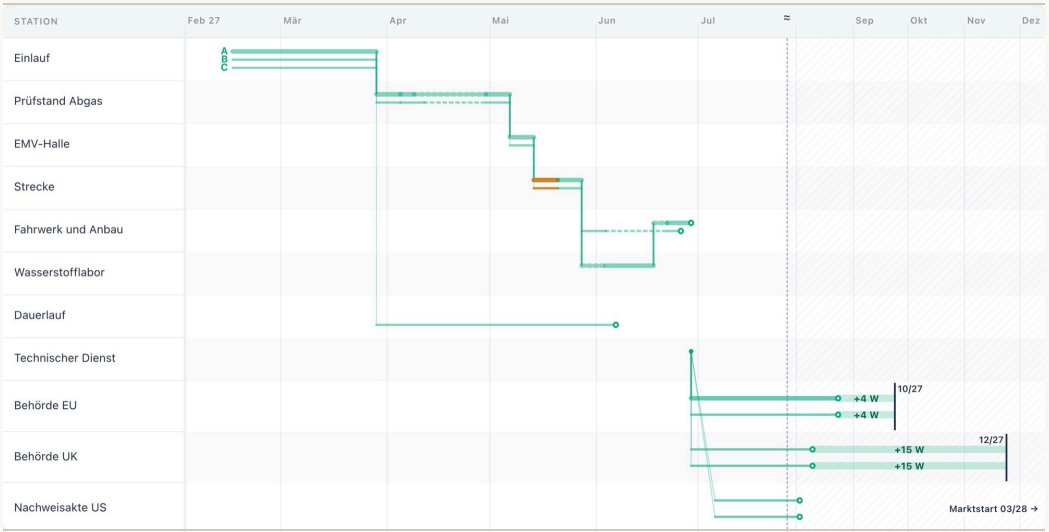
Two	too few: vehicle A has to drive ten weeks of durability after its tests. The EU hydrogen case misses the launch.
Three	the third vehicle drives the durability run in parallel. All six approval cases hold their launch.
Four	three more weeks of buffer for one more vehicle.

These four weeks are all XR 01 has for the rest of the programme.



The plan is set

Every test with station, vehicle and date, and below them the authorities per market with the buffer to market launch.



Stations on the left, time running to the right. Each line is a vehicle moving from station to station. Interface in German.

Einlauf	run-in of vehicles A, B and C from February 2027, 3,500 km each
Dauerlauf	durability run on vehicle C, in parallel with the tests on A and B
Behörde EU	EU authority: both variants with +4 weeks to launch 10/27
Behörde UK	UK authority: +15 weeks to launch 12/27
Nachweisakte US	US self-certification file, launch 03/28



CHAPTER 3

3

The software update

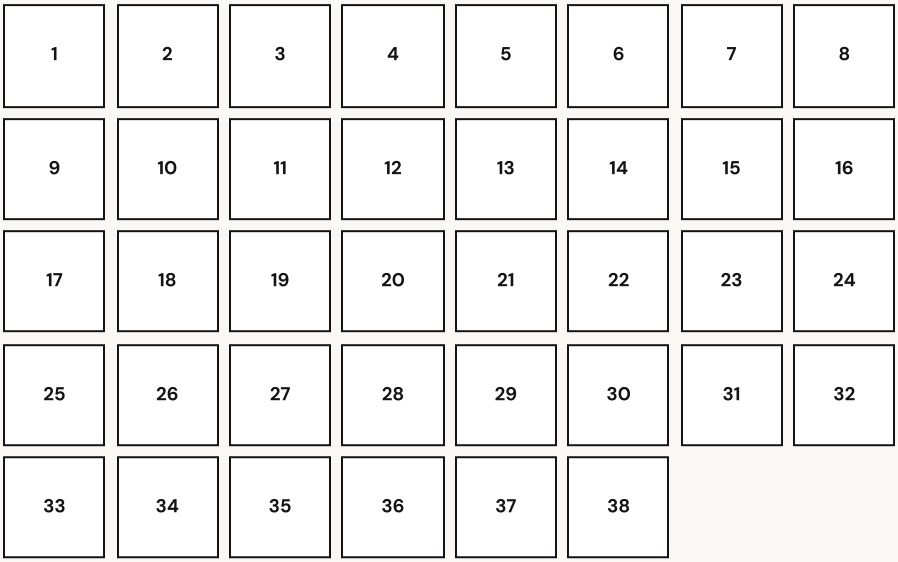
38 changes. Which one counts?

*AI-GENERATED IMAGE



Software 1.1

On 30 October 2026, engineering announces a new engine control release. Release on 10 May 2027, 38 change items.



The tests are planned, the vehicles ordered, none of them built yet. Which of the 38 changes touches a test planned on the old release? Usually an email round with engineering answers that, item by item.

38 → 2 → 1

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	38		

36 touch nothing approved: display, comfort, diagnostic texts, each with its reason

2 touch a test

1 moves a date

Also checked and not touched: noise, EMC and the cyber security deadline on 1 December 2027.



17

Change 17

Tank pressure diagnosis. The OBD test checks exactly this fault detection.

Proposal: test on release 1.1 and request the fault codes beforehand, because the change item doesn't list them. The OBD test is after the release anyway.

Touches a test. Date: unchanged.

4

Change 4

Cold-start injection map. It changes emissions, so the emissions test has to run on 1.1 and wait for the release on 10 May.

EU	+4 → +3 weeks
UK	+15 → +13 weeks
US	+29 → +27 weeks

One line out of 38. One week gone.



Proposed, calculated, decided

The change arrives as a proposal in the Today view, with finding, impact on every market launch and origin. A person accepts it. Interface in German.



Alt, Neu, Freigabe	old, new, release: from the configuration (PLM), with the change item verbatim
Vorschlag	proposal: target release 1.1, test no earlier than the release
Wirkung	impact: calculated by rules, not estimated, EU +4 → +3 weeks
Übernehmen	accept: a person decides, and the reason stays in the history

RULES	calculate every date and every buffer
AI	reads changes and proposes
PEOPLE	decide, and nothing changes without approval



CHAPTER 4

4

The noise test

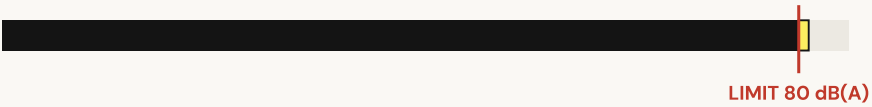
Can one decibel stop homologation?

*AI-GENERATED IMAGE



Failed by one decibel

81 dB(A) pass-by



Pass-by noise	81 dB(A), failed
Stationary noise	within the limit

The tests have run, the report is in the document system. One reading above the limit, and with it the question of who is affected.

Three markets, three answers

EU	**waits**	no approval without a passed noise test
UK	**waits too**	accepts the EU report, so it waits for the passed one
US	**unaffected**	no noise test required, the self-certification file doesn't wait

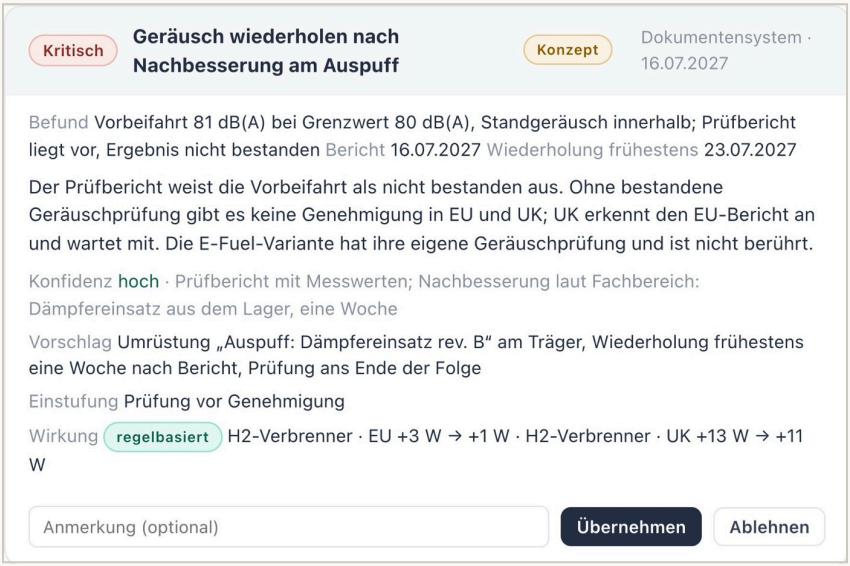
The e-fuel variant has its own noise test and is not affected.

Usually this surfaces market by market, in the next status meeting. Here all three answers arrive with the report.



One damper, two weeks

One week for the new damper insert from stock. The second because the repeat test moves to the end of the vehicle's sequence. Interface in German.



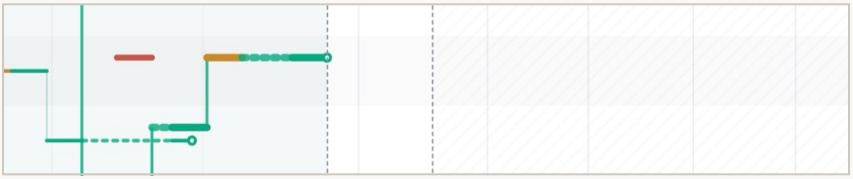
Befund	finding: from the test report in the document system, 81 dB(A), repeat no earlier than 23 July
Vorschlag	proposal: fit damper insert rev. B, move the repeat to the end of the vehicle's sequence
Wirkung	impact: EU +3 → +1 week, UK +13 → +11 weeks, calculated by rules

Noise fixed, emissions touched?

A new damper can change the exhaust back pressure. The emissions test ran with the series exhaust.

The proposal arrives with the report: a manufacturer's declaration as its own row in the EU case, otherwise repeat the emissions test.

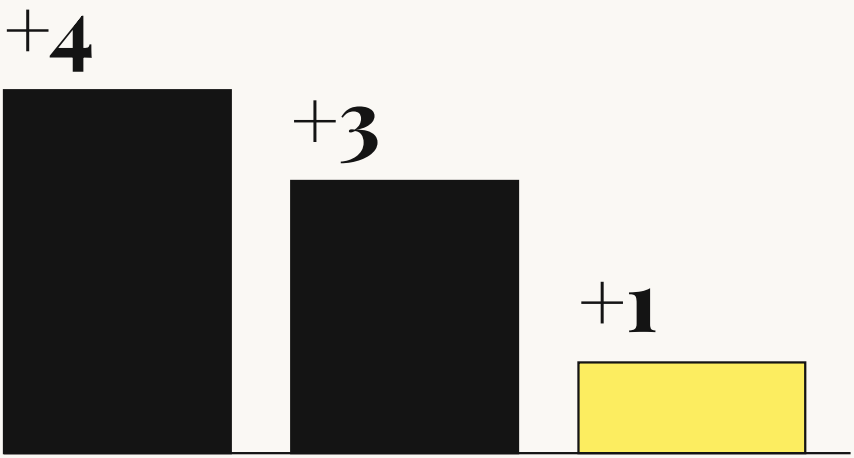
16 July	manufacturer's declaration added as a row in the case, damper insert rev. B fitted
23 July	pass-by repeat possible from here, at the end of the sequence
30 July	repeat passed, documents complete: 16 of 16 pieces of evidence



Detail of the plan, track station, July 2027: red the failed attempt, orange the refit, green the passed repeat.



Still October. Only just.



No event was a crisis. Together they used up three of four weeks.

On 30 July 2027, all tests are passed and the documents are with the technical service. One week remains to the EU launch on 1 October. Each of the three weeks was visible in the plan on the day it was lost, not in the next status report.



XR 01 is one programme. Your team plans many.

On the following pages we leave the trike behind. A portfolio like yours, eleven programmes with trikes, roadsters and coupés, planned in three ways. With each stage, a smaller team handles more model lines.

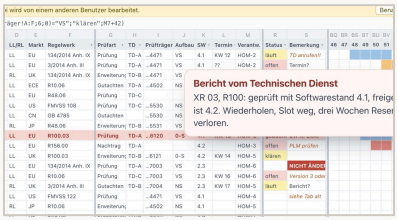
The values on the following pages are illustrative.

By hand, in a system, with agents

Most homologation teams plan in spreadsheets today. A plan in a system is the foundation. Agents working on that plan are the next step.

BY HAND

People collect



TEAM AND MODEL LINES

10 people, 4 model lines

EVENT TO DECISION

days

UNASSESSED CHANGES

over 100

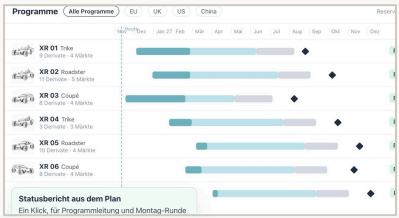
A CONTRADICTION SURFACES

only at the technical service

One row per test, variant and market. Status comes from emails, alignment meetings and the Friday status report.

IN A SYSTEM

People maintain



TEAM AND MODEL LINES

7 people, 7 model lines

EVENT TO DECISION

hours

UNASSESSED CHANGES

about 30

A CONTRADICTION SURFACES

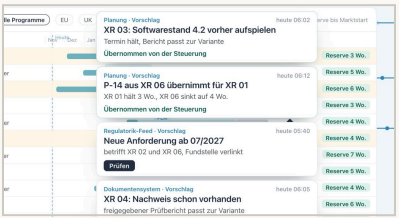
at the next comparison

Sources connected, one plan across all programmes, every field with its origin. A contradiction surfaces when someone compares.

*Illustrative values, interface in German

WITH AGENTS

Agents keep it current, people decide



TEAM AND MODEL LINES

6 people, 11 model lines

EVENT TO DECISION

minutes

UNASSESSED CHANGES

0

A CONTRADICTION SURFACES

as soon as a source changes

Every change from the sources arrives with a proposal, impact on market launch and an alternative. Nothing changes without approval.

Would a fourth vehicle have been worth three weeks?

For XR 01 we calculated it before ordering. In most programmes this question is never asked, because nobody can calculate the answer in time.

WHAT XORPUNKT DOES, AND WHAT IT DOESN'T

We plan. Others interpret the regulations.

REQUIREMENT TOOLS	from clause to requirement, to test, to evidence
XORPUNKT	from test to test vehicle, to slot, to date and to market launch

Your requirements and tests are our input. Regulations stay in the regulatory feed, documents in the document system. XORPunkt shows status, origin and decisions, never document contents.

One programme. Eight weeks. Fixed price.

We take one of your running programmes and plan it in XORPunkt with your data. At the end, you decide on measured values.

You provide	Exports from the market plan, test planning and dates. Two contacts from homologation, about two hours a week each.
You get	Your programme as a running plan across all target markets. A weekly status with buffer per market. The four measurements against your baseline.
At the end	You decide on rollout, integration and operation. No obligation without proven value.

WHAT WE MEASURE AGAINST YOUR BASELINE

01
Time from a change to an updated plan

02
How early a launch risk becomes visible

03
Hours spent compiling status

04
Number of status meetings

We agree the fixed price before the start, based on the size of the programme. No savings figure before we know your baseline.

You speak with the people responsible

Lorant Zambori

CO-FOUNDER AND MANAGING DIRECTOR

Ex-BCG. 20+ years in IT and digital product development. Automotive platforms, AI systems, regulated environments.

Andreas Lange

CHIEF SALES OFFICER

25+ years in automotive and defense. OEM and Tier-1 background. Connected vehicle services, aftersales, diagnostic and programming solutions for dealers.

XOR Digital GmbH, Olching, Germany. We build and run XORPunkt ourselves. Member of Cluster Mobilität, Bayern Innovativ.

YOUR PROGRAMME

Which approval date is critical for your programme?

Let’s discuss your programme, the open prerequisites and the workflow that takes most of your team’s time. In 30 minutes we show XORPunkt with XR 01.

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Book a call
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XORPunkt

Planning homologation with AI agents

AGENTS PREPARE. PEOPLE DECIDE.

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