

HOW TO ACCELERATE AN INDUSTRY

Horiba MIRA, the 80-year-old automotive validation station, is transforming itself into a one-stop vehicle development shop. Matt Saunders takes the tour

Ask 100 different people to conjure up a mental image in response to the words ‘Motor Industry Research Association’, and 98 of them would, I reckon, probably draw a blank. “MIRA?” they’d ask. “Don’t they make power showers?”

The remaining two – if they were UK-abiding car-literate folks, at least – might just picture some yellowing library footage of an interchangeable British Leyland model of the early 1970s wobbling and wriggling its way across a cobblestone track or locking up its wheels as part of some cadence braking exercise (the film very likely also depicting some clipboards along with fairly extravagant facial hair and large, practical spectacles).

And, until now, that is precisely how the management at what is now Horiba MIRA Ltd

– once only known by those ‘in the know’ as the UK’s secret but communally operated car industry testing and validation centre, located just to the west of Hinckley in the West Midlands – would have wanted it.

Trouble is, that is now a woefully outdated and grossly inaccurate representation of all the things that Horiba MIRA does in 2024 – and a poorer description still of all the things it will shortly be doing on behalf of its various clients, among so many companies, small and large, old and brand new, within the sprawling network of the global automotive industry.

The truth is that while those of a certain age probably can’t help picturing the place in the particular historical context of Britain’s post-war motor industry boom, this might actually have since become the most innovative, forward-looking motor industry location anywhere



Advanced DiM 250 simulator can move in nine different planes

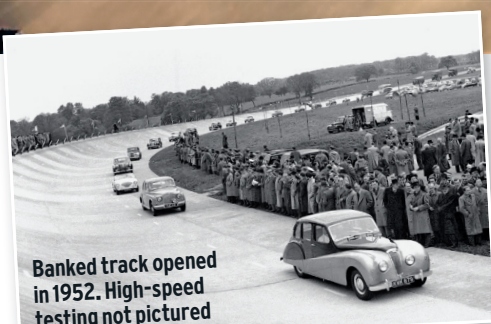


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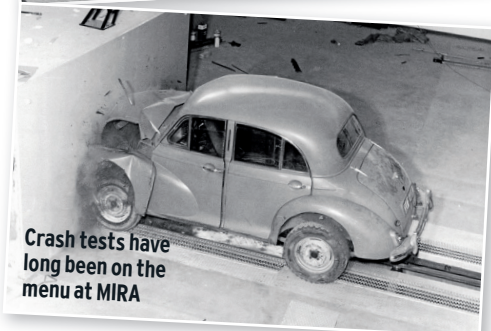
in the UK. And, under its current ownership and management umbrellas, its bold plans for expansion continue apace.

This can still be the place to come and do testing and validation of so many prototype cars, of course. But today it is also a major centre for crash testing and emissions certification, and it offers emergent car brands a full spectrum of design and engineering services. Horiba MIRA has developed new state-of-the-art facilities for advanced battery cell testing; for the development of advanced driver assistance systems and autonomous driving technology; for vehicle cybersecurity testing; and for virtual, simulator-based vehicle development. Pretty soon, it even plans to build its own car factory and add manufacturing services to the list of so many facilities that it offers.

Our tour of the place starts in a building about the size of a typical industrial unit, quite close to the humming traffic of the nearby A5, that houses the site’s new full-motion simulator.



Banked track opened in 1952. High-speed testing not pictured



Crash tests have long been on the menu at MIRA

“MIRA has become the most innovative motor industry location in the UK”

In a high-roofed workshop big enough to park several HGVs sits a simulator rig consisting of three large, horizontal hydraulic arms and nine smaller, diagonally fixed vertical ones, all of which are attached to the bottom of what looks like about half of a BMW 1 Series.

A sliding platform gives you access to the elevated ‘car’, which rises up when it’s being operated in front of a curved projection screen that wraps around the front of it. The control arms give the simulator nine planes of movement instead of the usual six: along with roll and pitch, it can rise and fall and move both laterally and longitudinally to simulate any and every kind of physical force that might act on a moving car. All the while, the image projected on the curved screen, which fills the windscreen entirely, alters with the car’s movement to give the driver a faithful impression that he or she isn’t in a workshop at all but rather on a motorway, a proving ground or even a race circuit.

This is a DiM 250 driving simulator supplied by specialist VI-Grade, and it’s the first of its kind in the UK. Installed in September last year, it’s partnered with a smaller, fixed simulator much more like a gaming rig. Between the two, Horiba MIRA is able to offer accelerated early-phase vehicle development to its industry clients. →

“Up to two years of a typical five- or six-year development schedule can be saved in the virtual world”

Simulator's large curved screens give a convincing view of a virtual world

“Manufacturers spend tens of millions of pounds building early-phase experimental prototypes of upcoming models, when they’re making big-picture decisions about vehicle attributes,” explains Tom Lee, Horiba MIRA’s senior manager of vehicle attributes. “Do all that in the virtual world instead and a lot of R&D expenditure and time can be saved: we estimate up to two years of a typical five- or six-year development schedule, depending on the project, not to mention the other associated resources and carbon emissions.”

A couple of turns in the simulator leave me rather glad to return to dry land, although the sim technicians assure me that you get used to the way it reproduces lateral and longitudinal loadings, and one can in time overcome the initial wooziness. Additionally, much can be done with the rig’s motion calibration to suit an operator’s particular experience.

It’s certainly uncannily good at simulating vertical ride inputs. Virtual potholes and speed bumps feel just like the real thing as they pass under your non-existent wheels, while complicated combinations of yaw, pitch and roll, as you tackle a cone slalom or fast lane change, feel just right. The simulator is even good enough to recalibrate an ESC system entirely in the digital realm, they tell me. I think if it was my project, I’d still want a few physical early prototypes, but if this meant I could build half as many, I’m sure it’d be worth the financial saving.

Next, for a quick look at the proving ground’s CAV – short for connected autonomous vehicle – testing facilities. These now include several test areas intended mostly for the development and tuning of advanced driver assistance systems, or ADAS, as they’ve become known. There’s a ‘road course’ of deliberately inconsistent lane markings, hills, crossroads and offset junctions,

Tom Lee (on right) explains MIRA’s business case



A post-simulator breakfast-ejection was happily averted



A BRIEF HISTORY OF MIRA

The Motor Industry Research Association was created by the government in 1946 to pool industry expertise at a time when British firms were finding it difficult to export cars. Having investigated sites including Silverstone and Donington Park, the former RAF Lindley WW2 airbase was selected as the site for the new testing venue, which opened in 1948.

The facilities were initially composed purely of disused aircraft runways, with the first bespoke track – a section of Belgian pavé – built in 1951, followed by the high-speed circuit the following year. Test labs and other facilities came after that, and in 2001 MIRA became a limited company. In 2015 it was bought by Japanese testing equipment group Horiba.

layout markings you may deem necessary in order to test a particular bit of lane keeping, crash avoidance or self-driving tech. Feeder roads leading onto it let you enter at motorway speeds, then you've got whatever space and scenario you need to interrogate and evaluate the strengths and weaknesses of the system.

Test facilities like this are rare, and sufficiently so that Horiba MIRA has just been chosen to carry out independent, next-level ADAS testing and certification of new cars as part of Euro NCAP's upcoming, updated safety testing programme for next year.

Our tour concludes in Horiba MIRA's cybersecurity workshop. It's the most ordinary-looking laboratory we've seen to far, but it's where some of the most cutting-edge investigative work is done to ensure that modern cars are fully hack-proof and digitally secure and that the magnetic fields produced by their electronic systems are properly shielded.

Here, teams of engineers with laptops and radio transceivers will bombard new cars with myriad 'RF' frequencies to check that a thief with a scanner couldn't simply chance on the right one to gain access to it. They'll use 'fuzzing' (interrogating or 'prodding' the vehicle with radio frequency inputs close to the one it's expecting) to try to digitally break in and steal personal information from it. Most of the time, they say, new cars themselves are very secure and guard your personal data very closely; however, the smartphone apps you might download and then sync with your car, for this reason or that, aren't always so fastidious.

"We've got a vision to become Britain's one-stop shop for vehicle development," explains MIRA managing director Declan Allan, as our tour wraps up. "Whether you're a British OEM gearbox or headlight manufacturer with 100 years in the business, or a new car brand doing everything for the first time, we want you to come to us in the UK rather than taking your project work abroad."

The place can certainly handle a broader range of development work than even I realised, as someone who used to visit just about every week for several years as part of the Autocar road test benchmarking routine. Horiba MIRA is an innovative and future-facing business; and it is clearly driven to grow, diversify and stay relevant. And if you look hard enough, you can still find those cobblestones. **A**

along with one of movable walls and 'shop window' boards made out of bricks and mortar where needed, in order to reflect radar just so. All are intended to catch out underdeveloped autonomous emergency braking, active lane keeping and intelligent cruise control systems.

Remote-controlled target dollies, with imitations of pedestrians, cyclists and moving traffic, are used to check that the systems work just as intended, while safety is maintained for all concerned. On MIRA's low-speed course, these are generally set up to reproduce potentially dangerous crash scenarios at junctions. Elsewhere, meanwhile, there is a special test area called the Assured CAV Highway testing area – or 'The Black Lake', a little more colloquially – where ADAS testing at motorway speed can be done. Imagine an area of asphalt the size of about 20 football pitches, dead flat and ready to be marked out with whatever road

Complex junctions test the mettle of self-driving cars



Even advanced ESC systems can be calibrated virtually



Cybersecurity lab measures resilience to digital attacks



'Black Lake' allows safe ADAS testing at motorway speeds