ENGINEERING SUCCESS

CASE STUDIES PORTFOLIO

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This portfolio is a collection of case studies showing how complex innovation becomes a scalable growth engines when executed through an NPD portfolio-lens.

Each case demonstrates how a healthy NPD portfolio drives profitability, reduces risk, align cross-functional teams, design products for scalability and capital efficiency.

Across food, healthcare, materials, manufacturing, the common thread is not just technology, but how innovation is selected, structured, and scaled to deliver repeatable value.

The case studies reported were performed in collaboration with Dr Gary Thompson, Managing Director of JAG Design.

CASE STUDY 1: AUTOMATED VERTICAL OYSTER MUSHROOM PRODUCTION SYSTEM

Background

Oyster mushrooms are a critical ingredient for fast-growing vegan and alternative-protein products. Yet traditional mushroom farming introduces portfolio-level risk for the client:

- Unpredictable yields
- Labour-heavy operations
- Disease exposure
- Large spatial footprint
- Limited scalability

From a portfolio health perspective, this created a dangerous imbalance for the client:

- Strong commercial pull
- Weak operational scalability
- High execution risk at scale

My role as NPD Portfolio Coach was to ensure this opportunity earned its place in the portfolio as a repeatable, investable growth platform.

CASE STUDY 1

The Challenge

This initiative needed to:

- Reduce dependency on fragile, field-based production
- Convert a biological process into a controlled system
- Demonstrate scalability *before* major capital expansion
- Prove unit economics suitable for national food supply
- Support investor confidence and funding readiness

The NPD Strategy

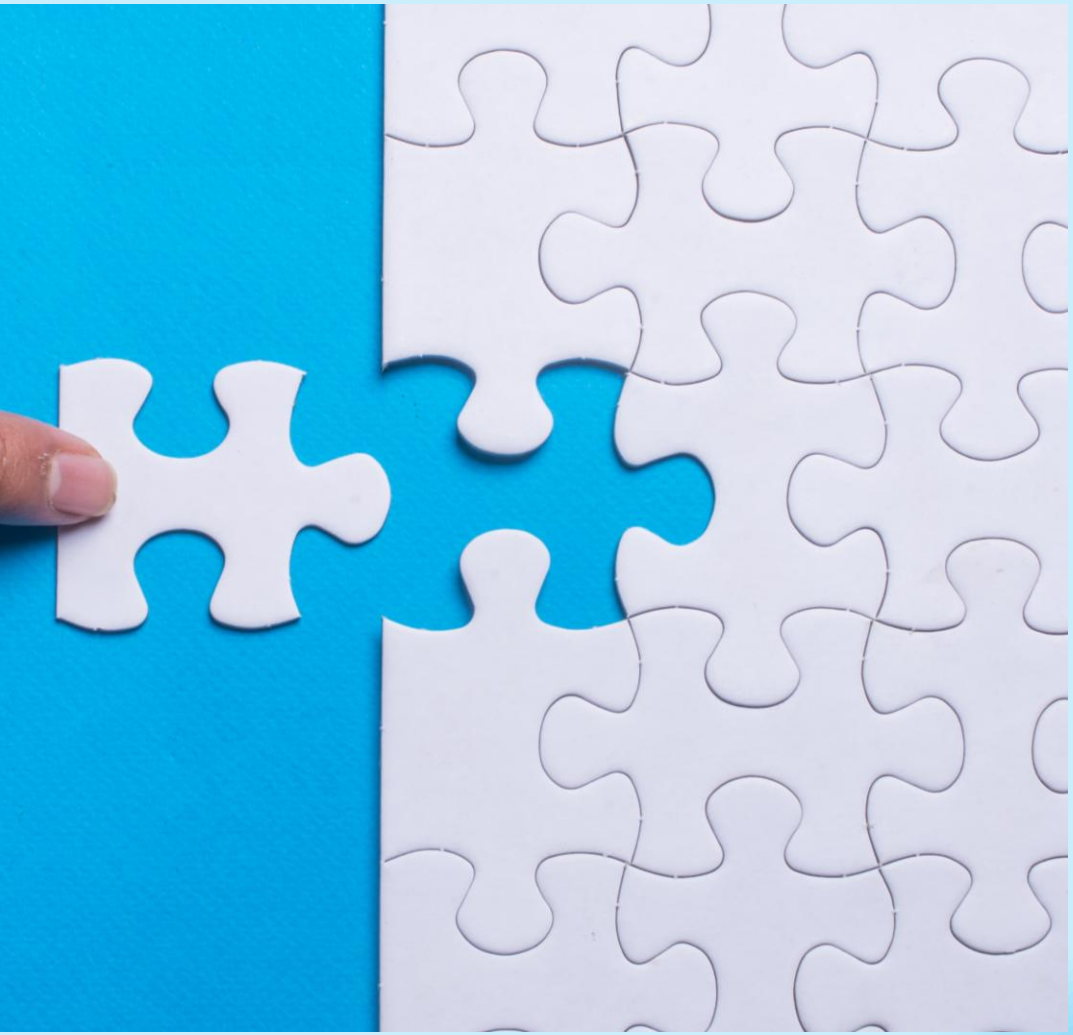
Rather than treating this as a one-off innovation, we reframed it as a modular NPD asset.

Together, we:

- Positioned the project as a low-footprint, high-yield production platform
- Designed scalability into the concept *from Gate 1*
- Prioritised automation to reduce labour risk across the portfolio
- Ensured data visibility to support future portfolio decisions

The result was an automated vertical mushroom system engineered for repeatability and capital efficiency.

CASE STUDY 1



The Solution

We developed a fully controlled, AI-enabled growing system based on modified IBC units:

- Vertical, tube-based cultivation maximising yield per square metre
- IoT-controlled environments eliminating disease and variability
- AI vision systems triggering automated harvesting at peak maturity
- Two harvest cycles per growth medium, maximising asset utilisation
- Stackable, modular units enabling rapid capacity expansion

Each IBC delivered:

- 100 kg every 7 weeks
- 95% yield efficiency
- Minimal labour intervention
- Predictable output suitable for commercial contracts

From an NPD portfolio perspective, this shifted the project from high-risk innovation to scalable production platform.

CASE STUDY 1

Portfolio Outcomes & Business Impact

This project materially improved the client's NPD portfolio health:

- ✓ Reduced operational risk through controlled-environment production
- ✓ Increased capital efficiency via modular, repeatable units
- ✓ Enabled reshoring without increasing complexity
- ✓ Strengthened supply-chain resilience across product lines
- ✓ Provided a clear scaling pathway aligned with demand growth

The system de-risked future NPD initiatives relying on mushroom inputs—unlocking downstream innovation without compounding risk.

Investment & Scale Readiness

Because the project was structured as a portfolio-aligned growth asset, not an isolated experiment, it:

- ✓ Secured a six-figure investment
- ✓ Enabled rapid capacity expansion
- ✓ Created local employment
- ✓ Positioned the company as a credible national supplier

CASE STUDY 2: OPTICAL ENHANCED PET RECYCLING SYSTEM

Background

Demand for food-grade, recycled packaging film is increasing rapidly, driven by sustainability commitments.

However, persistent contamination issues (black spots and inclusions) undermine:

- Product quality
- Production efficiency
- Customer confidence
- Portfolio credibility of recycled materials initiatives

From a portfolio health perspective, this created an imbalance for the client:

- Strong market and regulatory pull
- Weak process capability
- High risk of downstream value leakage

My role as NPD Portfolio Coach was to help convert recycled PET from a portfolio liability into a scalable, performance-reliable platform.

CASE STUDY 2

The Challenge

This initiative needed to:

- Operate at industrial throughput without compromising quality
- Meet food-grade purity standards consistently
- Integrate into existing operations without destabilising other portfolio projects
- Deliver measurable KPI improvements aligned with commercial outcomes
- Strengthen the long-term case for circular materials innovation

The NPD Strategy

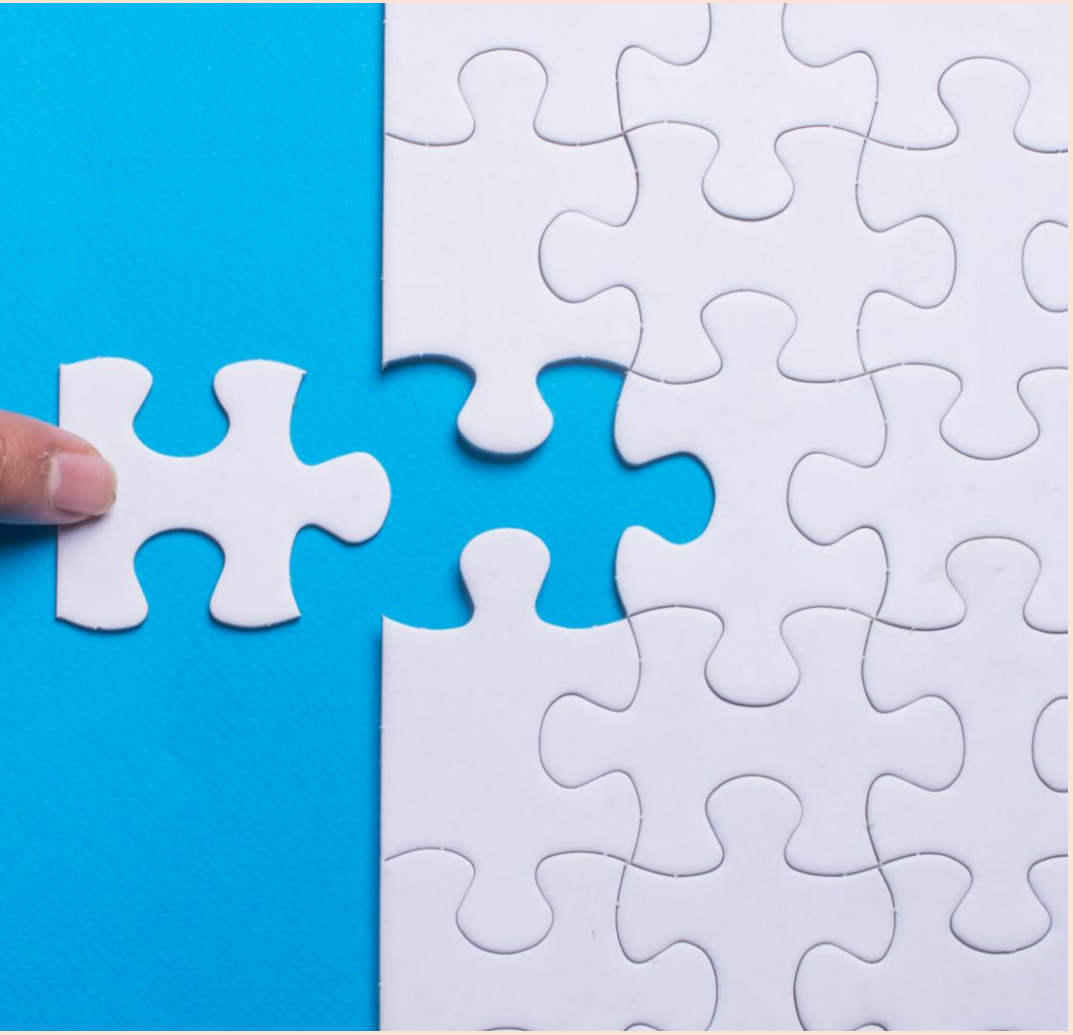
We positioned it as a foundational capability for future product and material innovation.

Through portfolio coaching, we:

- Clarified the system's role as an enabler across multiple NPD streams
- Aligned quality, throughput, and sustainability KPIs at portfolio level
- Ensured scalability and integration were addressed early—not retrofitted
- Structured decision-making around risk reduction, not technical novelty

This approach supported the UK's first high-throughput optical PET separation line

CASE STUDY 2



The Solution

The deployed system combined mechanical and optical technologies to deliver predictable, food-grade material quality at scale:

- Primary crushing and size reduction to <10 mm for consistency
- High-speed optical sensor arrays analysing particle opacity in real time
- Automated gated separation removing non-compliant material instantly
- Integrated control systems tracking performance against live KPIs
- The line processed up to 60 tonnes per hour, transforming recycled PET into a reliable, repeatable input for high-value food-packaging applications.

CASE STUDY 2

Portfolio Outcomes & Business Impact

This initiative materially improved the client's NPD portfolio health:

- ✓ Significant reduction in black-spot defects in food-grade film
- ✓ Increased yield of usable recycled PET
- ✓ Improved process stability and operational efficiency
- ✓ Reduced waste and stronger sustainability performance
- ✓ A credible foundation for future circular-materials innovation

By stabilising recycled PET quality, the company reduced risk across multiple downstream NPD projects, not just one product line.

Leadership, Teamwork & Execution

Equally important to the technology was how the work was done.

Success depended on close collaboration between R&D, operations, quality, sustainability, and commercial teams, all aligned around shared portfolio objectives rather than siloed targets.

Portfolio-level coaching helped teams resolve trade-offs early, align KPIs, and move decisively through implementation.

CASE STUDY 3: AUTOMATED PRODUCTION LINE FOR POSTPARTUM RECOVERY PADS (“PADSICLES”)

Background

A rapidly growing women’s health company set out to commercialise a postpartum recovery product known as the “padsicle”, a therapeutic foam pad infused with healing additives to support comfort and recovery after childbirth.

From a portfolio health perspective, the product faced a familiar problem for the client:

- Strong product–market fit
- Fragile, manual production capability
- High risk of quality drift at scale
- Exposure to regulatory, supply, and reputational risk

Without a scalable manufacturing backbone, the padsicles risked becoming a growth bottleneck rather than a portfolio growth engine.

My role as NPD Portfolio Coach was to ensure this product could scale without consuming disproportionate capital, management attention, or operational risk.

CASE STUDY 3

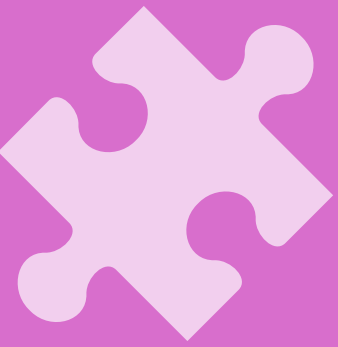
The Challenge

This initiative needed to:

- Deliver medical-grade consistency at high volume
- Integrate forming, dosing, and packaging into a single continuous flow
- Maintain traceability, hygiene, and uptime
- Support rapid national rollout without repeated redesign
- Convert demand momentum into reliable, repeatable output

The NPD Strategy

Rather than building a narrowly optimised line for today's volumes, we designed the system as a scalable NPD asset.

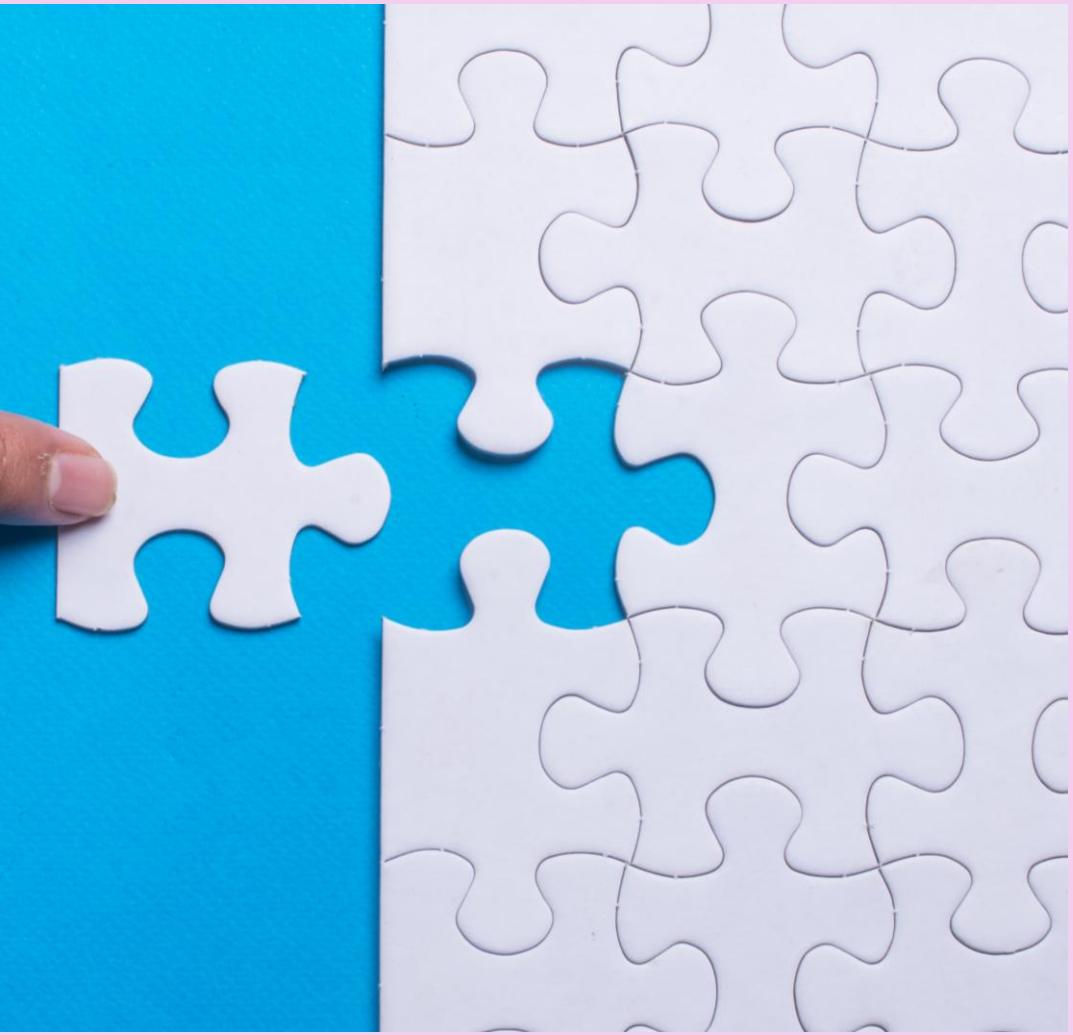


Through portfolio coaching, we:

- Positioned manufacturing as a core enabler of portfolio growth,
- Aligned throughput, quality, and uptime targets with commercial and regulatory
- Designed for capacity expansion and repeatability from first deployment
- Reduced execution risk by integrating all critical steps into a single automated flow

This ensured the Padsicle moved through the portfolio as a scale-ready product, not a fragile success.

CASE STUDY 3



The Solution

We engineered and commissioned a fully automated production line covering every stage of Padsicle manufacture:

- Foam handling and press forming using 1-metre-wide substrate rolls
- A 1.2-metre press tool producing five components per stroke
- Precision dosing systems depositing up to 3 ml of healing additives
- Continuous vacuum-sealing and packaging, meeting medical-grade standards
- On-site installation and validation

The line achieved:

- 45 finished components per minute
- 99.5% operational efficiency
- Stable, repeatable output suitable for national distribution

From a portfolio perspective, this converted manufacturing from a risk factor into a strategic advantage.

CASE STUDY 3

Portfolio Outcomes & Business Impact

The initiative materially improved the client's NPD portfolio health:

- ✓ Enabled rapid scaling without compromising quality
- ✓ Reduced operational and regulatory risk
- ✓ Improved capital efficiency through automation
- ✓ Supported nationwide distribution across the USA
- ✓ Strengthened brand credibility with clinicians and end users

Most importantly, the production line removed a systemic constraint, unlocking growth across the wider women's-health portfolio.

Leadership, Teamwork & Execution

The success of the Padsicle was driven by tight cross-functional collaboration.

Product, clinical, operations, quality, and engineering teams aligned around shared portfolio objectives rather than local KPIs.

Portfolio-level coaching ensured decisions were made early, trade-offs were visible, and execution remained focused on scalable outcomes.

CASE STUDY 4: NEUROMOTOR DIAGNOSTIC PEN

Background

Within client's innovation portfolio, early neuromotor diagnostics represented a high-potential but high-risk opportunity.

The clinical need was clear: earlier, more objective detection of neuromotor impairments could improve patient outcomes, reduce system costs, and unlock new applications in screening, rehabilitation, and drug development.

However, from a portfolio perspective, the initiative faced classic early-stage risks:

- Heavy reliance on unproven biomarkers
- Technical uncertainty across hardware, data, and usability
- Long regulatory and clinical adoption pathways
- Capital exposure before manufacturability was proven

My role as NPD Portfolio Coach was to help shape this idea into a credible, staged portfolio asset.

CASE STUDY 4

The Challenge

This initiative needed to:

- Convert subjective clinical observation into objective, repeatable data
- Demonstrate technical feasibility without locking in premature design decisions
- Balance clinical ambition with manufacturability and scalability
- Integrate seamlessly into broader diagnostic workflows
- Create clear decision gates

The NPD Strategy

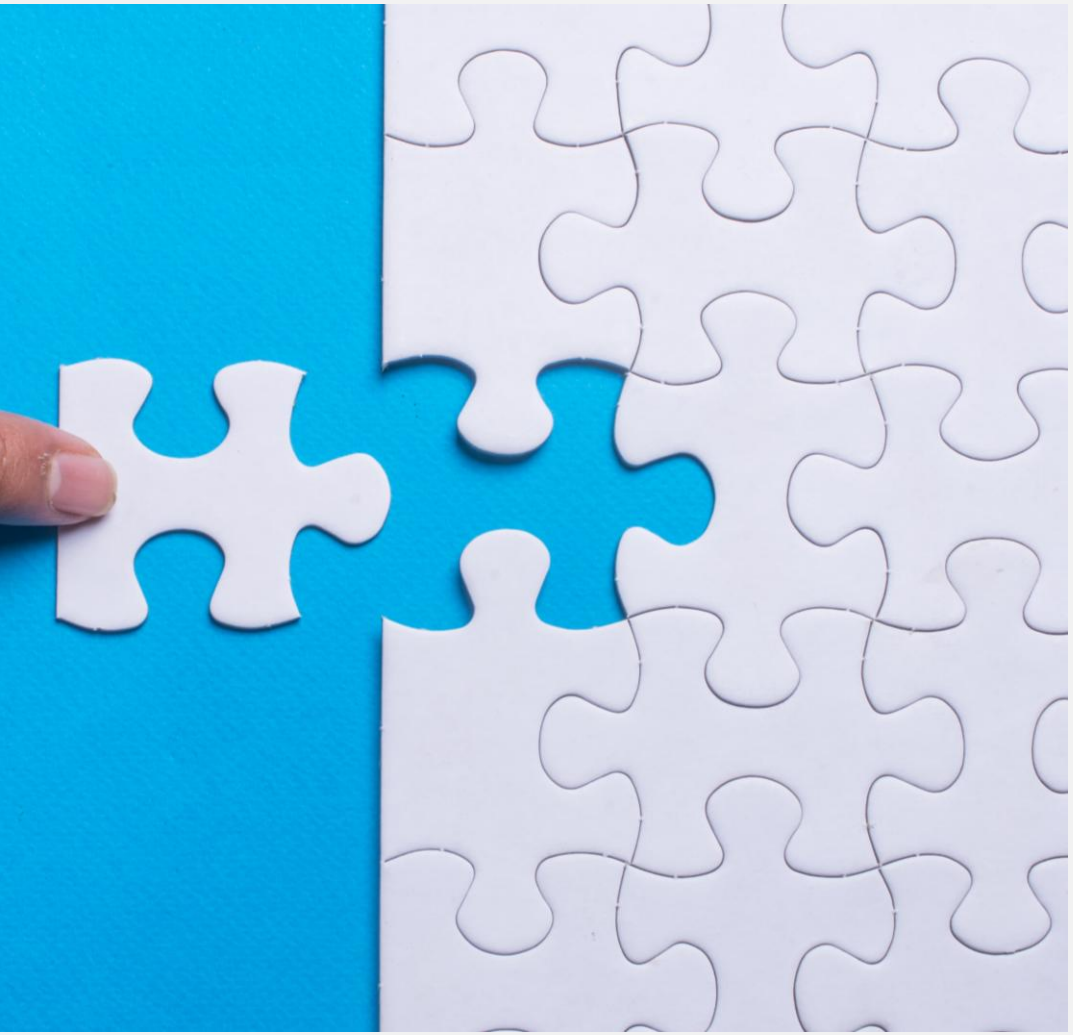
Rather than pushing directly toward a “finished product,” we structured development around portfolio learning and de-risking milestones.

Through coaching, we:

- Defined the pen’s role as a platform component within the wider portfolio
- Prioritised early validation of signal quality and repeatability over cosmetic design
- Ensured the prototype iteration reduced uncertainty across clinical, technical, manufacturing
- Aligned development decisions with future regulatory and investment expectations

This approach allowed the development of Neuromotor Pen as a disciplined NPD programme

CASE STUDY 4



The Solution

The Neuromotor Pen was developed through multiple controlled prototype iterations, integrating precision mechanics, sensors, and signal interpretation:

- Gimbal-based position monitoring capturing high-fidelity movement data
- Baseline comparison algorithms translating micromovements into potential neuromotor biomarkers
- Iterative prototyping improving accuracy, ergonomics, and manufacturability at each stage
- System integration with client's broader neuroscience data platform

Each iteration was designed to retire specific portfolio risks, ensuring progress was measurable and decision-led.

CASE STUDY 4

Portfolio Outcomes & Business Impact

This initiative significantly strengthened the innovation portfolio position:

- ✓ A functional prototype ready for clinical testing
- ✓ Objective, repeatable neuromotor measurements
- ✓ Clear applicability across multiple clinical and commercial use cases
- ✓ Improved readiness for partnerships, trials, and external investment
- ✓ A defined pathway from concept to scalable medical device

The project established a repeatable development logic for future diagnostic tools within the portfolio

Leadership, Teamwork & Execution

The breakthrough was not driven by engineering alone.

Progress depended on close collaboration between neuroscientists, engineers, data specialists, clinicians, and product leaders, all aligned around shared portfolio goals.

Portfolio-level coaching ensured that insights flowed across disciplines, trade-offs were surfaced early, and technical progress remained tightly coupled to clinical relevance and business viability.

The case studies reported highlight a fundamental truth of high-performing NPD portfolios:
innovation only delivers ROI when scalability, risk and capital efficiency are designed in from the start and managed at the portfolio level.

By aligning strategy, operations, engineering, data and commercial teams around clear portfolio decisions, we converted a high-risk initiative into a repeatable, investable growth capability - strengthening the entire innovation pipeline not just a single product.

If you're asking how to improve your NPD portfolio health without triggering costly trade-offs or killing innovation, let's talk.

Email me at info@engineeringsuccess.co.uk and I will be more than happy to have a chat.

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THANK YOU

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