[Feeling festively innovative!](#)

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Jul 2023

Feeling festively innovative!

Each year Northumbrian Water hosts the Innovation Festival where people from all over the world come to the North East to spend a week collaborating and working together to solve challenges the sector faces. Through sprints, workshops and hacks, folks try to find innovative solutions to problems – but most importantly, it's a lot of fun!

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[Alex Waterston](#)

Associate Director - Innovation & Leadership

Email

alex.waterston@waterstons.com

Linkedin

https://www.linkedin.com/in/alex-waterston-0a56551b5/

 It's got the vibe of a summer music festival with food – shout out to the pancakes - and beer, and there was even a DJ with bongos at one point.

Our innovators, software experts and data gurus all went along to the festival to let their creativity run wild, and this is what they got up to…

INNOVATION

The Innovation team took part in a sprint about smart water tanks and understanding how to reduce spills, and in the end they made a game! Here's what each of them took from the event.

[Alex](#) - **Associate Director - Innovation & Leadership**

Northumbrian Water's Innovation Festival is a marvellous thing, eh? If you haven't been I'd so strongly recommend popping along to it next year, even just for a day. It's a real insight into what is possible if you have a total commitment to the bit and a bunch of really brilliant people to pull it off. Definitely something to aspire to!

One of my highlights of the festival is a bit of a weird one but it took me right back to the roots of my career. Our hack for the week was a little simulation game which very, very simplistically modelled the operation of a storm tank - letting players decide when to turn pumps on and off to try to prevent spillages into rivers and waterways.

I spent the first six or seven years of my career as a game developer and it was so much fun to dredge some small amount of knowledge out of the depths of my brain for the past few days.

It is, however, a very specific part of the game-making process that I really enjoyed this week and, remarkably, it involves an Excel spreadsheet. Way back in the depths of time I worked on a game I won't name for a company that will also remain nameless. The game was a recreation of the classic playground game assassin. Each player was given one other player that they needed to assassinate in a great big loop. Each time you killed your quarry you acquired their target as your own.

The owner of the studio, who was also the lead designer of the game, had a very complex scoring system for the game that both added and subtracted points for all sorts of different things but during playtesting we kept finding that one player would get an incredibly high score and everyone else's score would be negative.

Cue me spending an entire day building a scoring model in a spreadsheet that ran a simulation of a full game a thousand times over showing average scores for all players. It modelled variance in player ability, the different scores for different types of kills, all the negative scores awarded for dying or making mistakes and everything we could possibly think of and it provided a way to very quickly change the point values for each.

We used a spreadsheet to balance an extremely complex game. This week I did the same again! I built a spreadsheet to model the water in the system and how players might play and we used it to balance the speeds of pumps and the sizes of tanks and I absolutely loved it.

[Andrew](#) - **Innovation Consultant**

This was my fourth year at the innovation festival. Last year, we made an AI model that detected rats. Well, since there were no rats available to train the AI on, we actually made an AI model that would detect if someone was wearing toy rat ears. Going into this year, we wanted to build something during the hack days that had that sort of chaotic energy. This year we built a game - Storm Drain Hero!

The challenge was about storm tanks, and what happens when they overflow into the environment. We decided to build a game that would realistically simulate the process based on data. This would let people better understand why spillages happen and give them a chance to see it's a really difficult problem to try to solve. The game asks you to control a pump to make sure spillages don't happen and

balance that against the electricity costs of running the infrastructure.

Why would we want to make a game though? Apart from it being super fun (obviously), why is this a good way to approach the problem?

- Building a full-scale digital twin is a long-term, difficult, and expensive project. Starting small, with a simplified model and building on top of that is a good way to start. Aside from starting small, why not de-risk-ify it further? By making it a game, even if the full-scale digital twin fails, you still have an amazing outreach tool. You could use it to get people into engineering, show the public the realities of what NWG have to go through, and take it to schools!
- High-end digital twins make use of game engines. Yes, data will be crunched in Azure or Databricks (or the data platform of your choice), but the front-end interactive part can be made in game engines, or tools reminiscent of one.

In the end, we managed to pull it off and make the game work. In my experience, ending a hack day with something that works is an achievement in itself! However, we also won "best visualisation", which I think is very well-deserved.
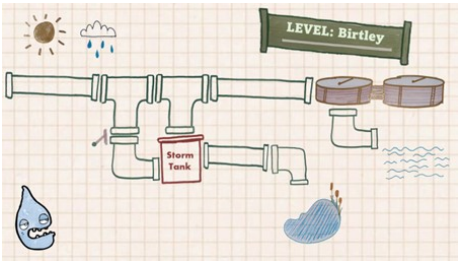
We are all really excited about the potential of continuing development of it. There are so many ways to make it a more fun game, but also develop the realism of the simulation behind it and the data we are feeding in.

Dani - Technology Consultant

This year's festival was a melting pot of brilliant minds and cutting-edge technology. From incredible startups transforming various industries to mind-blowing tech advancements, the event was a true showcase of the future. Here are my three Innovation Festival highlights:

1. **Robot dogs!** You can't beat a robot dog and people flocked to the 2 found wagging their mechanical tails at this year's festival! They not only look the part and cost over £100k – they are also helping to revolutionise operational roles, being able to sustain harsher environments and support humans in dangerous situations.
2. **Storm Drain Hero!** During the Microsoft-sponsored hackathon focused on storm overflow, our team proudly emerged with the Best Visual Award for our innovative gamification approach to tackling storm overflow challenges and awareness! It was an exhilarating experience where creativity flourished, and I had the privilege to engage with highly knowledgeable individuals from both the water industry and Microsoft.
3. **Pancakes!** The Ultimate Life Fuel; need I say more?

Overall, it was a blast to witness the convergence of innovation, tech and creativity in one place, as well as unleashing that creativity ourselves in the hackathon!

SOFTWARE

Frankie Clipsham, Software Consultant

This was my second time visiting the festival and I have to say it has exceeded my expectations on both occasions. Lightning talks, held throughout the week, and the exhibition area provided glimpses into a diverse range of exciting businesses. There was detailed planning into the festival's events and the food provided was outstanding. All of this fostered a great atmosphere, which encouraged collaboration and innovative ideas throughout the 'hack'.

The 'hack' in question focused on the mitigation of storm tank spills into rivers and waterways. Our team, including Andrew Buckingham and I, as well as four data specialists from different water companies, came together to tackle this challenge. We took the approach of a 'digital twin' to simulate the real-world layout of the site and create a model to consider parameters increasing or decreasing spill likelihood such as weather forecast and average demand on the network.

This led us into the idea of a 'critical friend' which would assist and operator in making decisions about when to empty storm tanks and at what rate. This would use the digital twin to reflect their decision back to them with the calculated outcome on a simple dashboard, which ended up winning the Best Overall Solution!
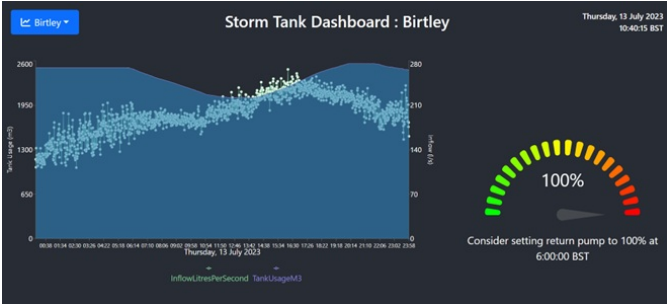
Ultimately, it was an excellent chance to collaborate with brilliant people from different sectors and backgrounds and I hope Northumbrian Water can take some inspiration from our proposed solution. I cannot wait for the next one!