



*In the chair with...*

# CHRIS SAWYER

As an iconic name for most PC gamers, Chris Sawyer and his Tycoon games paved the way for a new era of simulation games. As *Transport Tycoon* celebrates its twentieth birthday, Adam Barnes caught up with Chris to learn more about the reserved developer and his career

It's surprising, really, to consider how important the name Chris Sawyer is to so many gamers when he's responsible for just a handful of games. Whether it's the cheerful tooting of a steam train or the tick-tick-tick of a carriage slowly climbing that first peak of a roller coaster, Chris's games maintain a very special place in the hearts of gamers around the world. And yet the humble developer always favoured a more solitary approach to game creation, working almost entirely alone on his projects and avoiding the limelight of the media as much as possible. Even to this day his games remain hugely compelling, and it's not hard to see why. Twenty years on *Transport Tycoon* still maintains the same depth it once had, and hasn't been beaten yet. With an excellent port of the original PC classic now on mobile devices, is Chris helping to revive a much-loved yet underserved genre?

### Hi Chris, how did you first get into programming and making videogames?

I started programming while still at school in the early Eighties, and programming fascinated me – I loved the logic of it and the thrill of designing the sequence of instructions to do simple things on the screen. I started with BASIC on the school's Commodore Pet 2001 and RML 380Z computers, and then dabbled in a little machine code on the Pet's 6502 processor – not easy as it meant working out the machine code instructions in binary and then 'poking' them byte by byte into memory using a BASIC program. Most of these programming sessions resulted in games of some form or another, very simple games but satisfyingly fun to play, and great for showing off to my friends. Eventually I bought my own computer, though an odd choice – I bought a Computers Lynx while all my friends had the usual ZX Spectrums and VIC-20s.

### What was it that you enjoyed so much about programming, and did you ever see it as a potential future for yourself?

My interest and fascination just grew and grew – I loved programming and the challenge of trying to get the best out of these flawed and underpowered early home computers, and the thrill of creating your own little games. I had no idea that I'd end up with a career in computer games; I was still at high school at this time and programming was just a hobby. I remember my chemistry teacher pulling me aside one day and showing me a newspaper cutting, a young lad had written a game on the ZX81 and made over £1000 from it – I was in awe, but never thought I'd ever be that successful writing games. I think at that age I had no idea what I'd end up doing.

### How did you end up developing games for a living, then?

Things started developing a bit more on the games front after I started at university while studying a degree in Computer Science And Microprocessor Systems. I still had no ambition to make a career from games but during

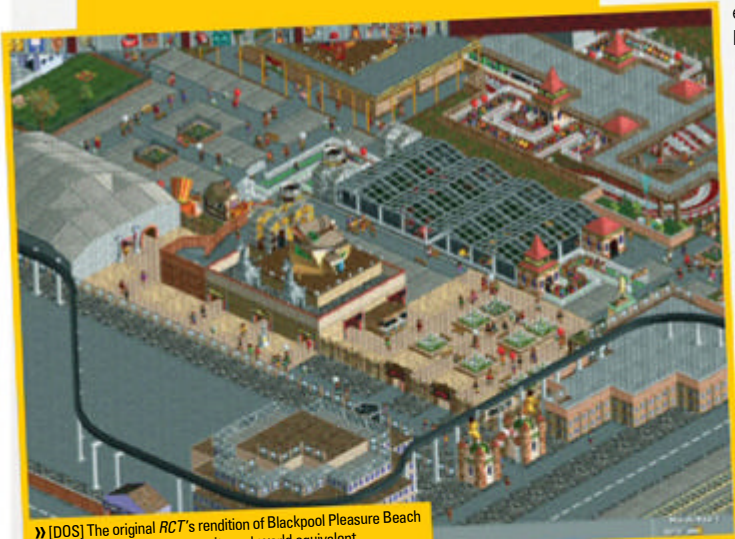
this period in the mid-Eighties, I had some of my Memotech MTX games published by Memotech themselves which was very satisfying, and I even made a small amount of money from them, enough to buy my first printer and a floppy disc drive I think. Eventually the Memotech gave way to an Amstrad CPC6128, and during my final year at university I bought an Amstrad PC1512 which was the start of a very long relationship with PC programming.

### What were some of your first games like? What sorts of games did you enjoy making?

I did all sorts of games on the Memotech and Amstrad computers in the Eighties, probably not much that was actually original – I'd often see pictures of arcade games in magazines and be inspired to create something similar on my own computer. Some of the last games I did on those early home computers were isometric viewpoint games and they were very challenging to program on such simple machines with limited graphics and memory and power, but very satisfying when you got it working. The isometric viewpoint became a fascination for me – and 30 years later it's still my favourite display format for a game.

### You became quite well known for your isometric games, what is it about the viewpoint that appealed to you?

I think it's the 'conciseness' of the isometric viewpoint I like – it shows three dimensions but remains very consistent in the way it shows depth as things don't get smaller in the distance like projected 3D. I think it holds many advantages – it limits the amount of detail the game has to show as the viewer can never get closer than a certain distance to any object, which means everything you see in the game appears to be consistently detailed. With projected 3D you either need to keep adding more detail as you get closer, or you end up with bland objects when viewed close up. I had experience with projected 3D back in the early days and even played around with projecting textures onto 3D polygons (this was long before hardware accelerated graphic cards so I actually wrote algorithms to draw the projected textures pixel-by-pixel in machine code), but I always seemed to come back to the isometric viewpoint for my own games as it suited the style and type of game so much.



» [DOS] The original *RCT*'s rendition of Blackpool Pleasure Beach was as grey and boisterous as its real-world equivalent.

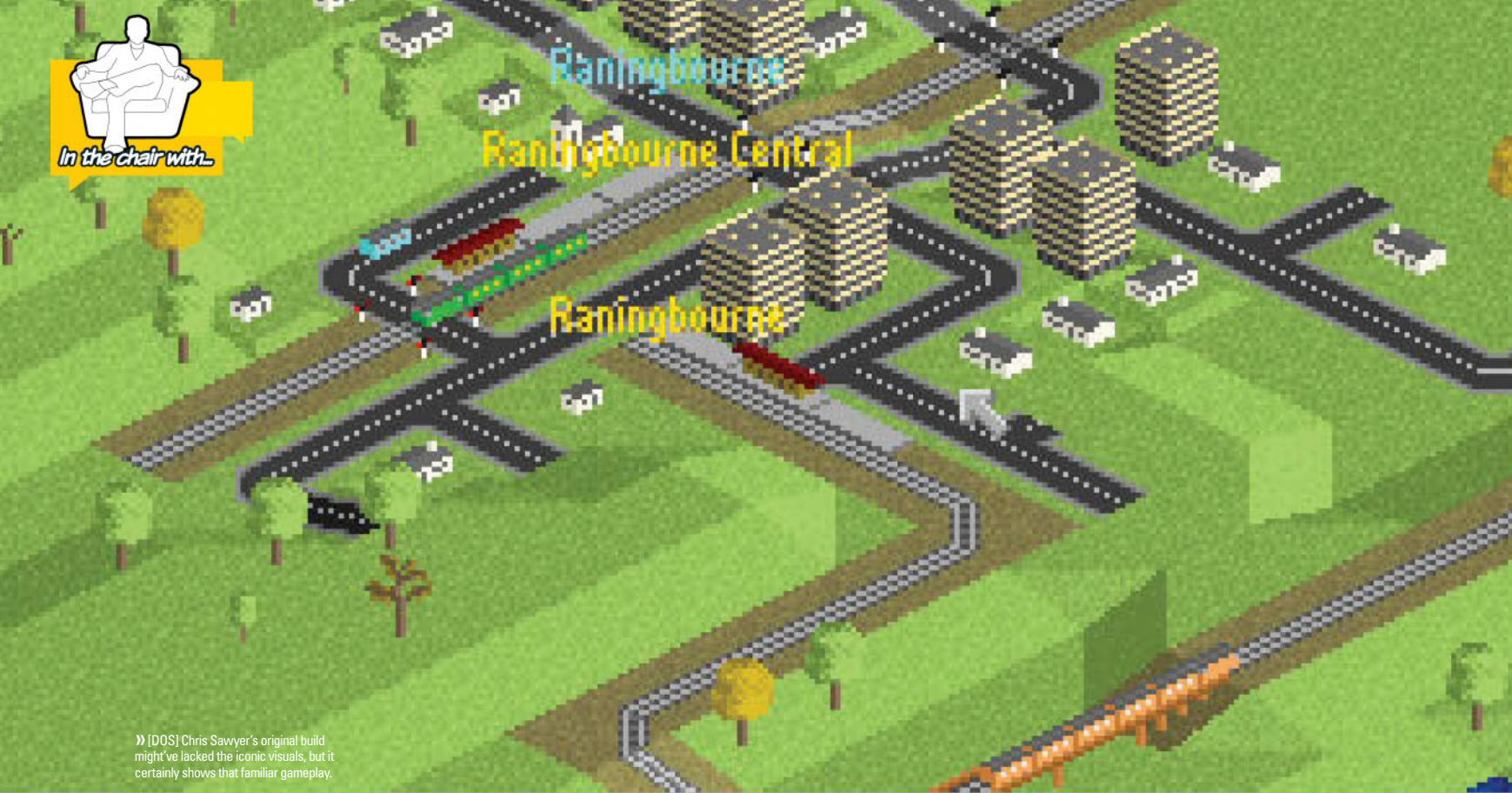




“ I loved programming and the challenge of trying to get the best out of these flawed and underpowered early home computers ”

Chris Sawyer





» [DOS] Chris Sawyer's original build might've lacked the iconic visuals, but it certainly shows that familiar gameplay.

11th Mar 1951  
 Cash: £49,716,687

Chris Sawyer's Transport Game  
 Copyright 1993 Chris Sawyer

► **So how did you end up getting into paid game development?**

I ended up doing DOS conversions as a bit of a stop-gap after I graduated from university – I'd been offered a job working full-time for Ariolasoft but this fell through at the last moment just before I graduated and there was no chance of getting a 'serious' job in the electronics industry as I'd missed all the application deadlines. So I got in touch with a business agent I'd heard of, Jacqui Lyons at Marjacq Micro, who represented many of the well-known UK programmers back in those days, and she set me up with my first DOS conversion – a contract to convert the Amiga/Atari ST game *StarRay* to the PC.

**How did you find the conversion work?**

I thrived on the work – it was challenging trying to get the PC to do anything like the same quality of graphics as the Amiga back then, but my knowledge of machine code meant I could get every last ounce out of the processor. I think the most well-thumbed book on my desk was the one which listed timings for every 8086 processor instruction as I was always trying to optimise every last byte of code to gain a little speed. *StarRay* had wonderful smooth-scrolling multi-colour graphics and sprites on the Amiga – on the basic PC it had 4-colour graphics which were rather less than smooth as they clunked across the screen, but it was good enough, and if you were lucky enough to have one of the super-duper new '286' PCs which had just been launched then *StarRay* looked fantastic with its VGA graphics and enough power to (just about) smoothly scroll. Many more DOS conversions followed – games like *Virus*, *Conqueror*,

**SELECTED TIMELINE**

**GAMES**

- STARRAY [DOS] 1988
- XENOMORPH [DOS] 1990
- ELITE PLUS [DOS] 1991
- BIRDS OF PREY [DOS] 1992
- FRONTIER: ELITE II [DOS] 1993
- DINO DINI'S GOAL [DOS] 1993
- TRANSPORT TYCOON [DOS] 1994
- TRANSPORT TYCOON DELUXE [DOS] 1995
- FRONTIER: FIRST ENCOUNTERS [DOS] 1995
- ROLLERCOASTER TYCOON [DOS] 1999
- ROLLERCOASTER TYCOON 2 [PC] 2002
- CHRIS SAWYER'S LOCOMOTION [PC] 2004

*Birds Of Prey*, *Elite Plus*, *Xenomorph*, *Dino Dini's Goal*, and *Frontier: Elite II*. I enjoyed the work and it paid well, though I became very frustrated that often I was unable to finish my contract because I'd caught up with the original game's programmer and had to wait for him before I could convert the remainder of the game. My solution was to take on two conversions at the same time – I did the PC conversions of *Dino Dini's Goal* and *Frontier: Elite II* in parallel, which worked quite well.

**It sounds like you were quite gifted at optimisation, then. Where there any specific challenges you encountered?**

Every game had its own set of challenges but I think the speed of updating the display was usually the main challenge for every conversion. Unlike the Amiga the PC had no hardware to help with updating the screen so it was all down to me to use every trick I could find in order to plot the individual pixels fast enough. I spent a lot of time writing bits of code using macros – which is a way to repeat a sequence of instructions with minor variations – instead of loops, as it avoided the extra processor cycles of jumping back to the start of a loop again. It resulted in quite a lot of machine code just for plotting objects on the screen but it was necessary to get enough speed.

**How did you come to work on your first game?**

I think it harks back to my fascination with isometric viewpoint graphics again. I started to tinker with creating an isometric display system on the PC in my spare time while still doing the conversion work. I think I even started creating a little platform-type isometric game, just to test the isometric system.



» [Mobile] The recent iOS and Android version of *Transport Tycoon* is an outstanding port of the original game, even on touch screens.





» [DOS] Founding your own company, naming it, picking your face and colour all helped make *Transport Tycoon* feel a little more personable than *SimCity*.



» [DOS] There were a handful of created scenarios to deal with, but for many the randomly generated sandbox levels were the crux of the game.



» [DOS] MicroProse suggested that Chris and Simon (Foster, artist on *Transport Tycoon*) designed additional themes to create extra longevity.

Things just sort of grew from there I think – I would work on the conversions enough to keep up with the development of the original games, and then in my spare time I would play around with assembler-code algorithms and ideas.

**And this led to *Transport Tycoon*. What was the inspiration for the game?**

I was fascinated with Sid Meier's *Railroad Tycoon* game – I played it for hours and hours, it was definitely my favourite game at the time. The viewpoint was just an overhead 2D map though, and I wondered whether my favourite isometric viewpoint would be better, and if other modes of transport should be included – I was inspired. The only other PC game I remember playing a lot around that time was Geoff Crammond's *Formula One Grand Prix*, and to this day I have still to find another driving game I enjoy as much as I remember enjoying that one.

**What was the process of development for the game like? Did you encounter any problems?**

I started creating *Transport Tycoon* – aka 'Chris Sawyer's *Transport Game*' or *I.T.S. 'Interactive Transport Simulation'* – just for fun really. I was managing to keep up with the conversion work but I still had a bit of spare time to play with and the excitement of tinkering with the new game helped balance out the monotony of the conversion work. By the time the last of my conversion contracts were complete I already had a fully-functioning version of *Transport Tycoon* up and running. It was in low-res and had my own clunky hand-drawn graphics but it was fully playable. I decided to devote all my time to the game for a few months and see what developed. I had the good fortune to cross paths with Simon Foster, who binned my low-resolution bitmaps and created wonderful new high-resolution bitmaps of trains, trucks, buildings and scenery for the game. Next, I also had the good

fortune of being at exactly the right time in the PC's development, which meant that processor speeds and graphics handling were improving enough for my game to be able to handle high-res graphics and sound. Within a few months I had a ninety per cent complete game, which we then showed to Microprose, and the rest as they say, is history.

Back in the old days you needed that efficiency to be able to do anything decent on home computers – you had to optimise every single instruction and ensure every item of data was stored in the least amount of memory possible, and I became used to working that way. Both *Transport Tycoon* and *RollerCoaster Tycoon* on the PC were entirely programmed in x86 assembler code. I still enjoy programming in assembler code much more than high level languages – C just frustrates me!

“ In my spare time I would play around with assembler-code algorithms Chris Sawyer ”

**You famously worked with x86 assembly language even as it was becoming more common to use the C programming language. What was it that appealed so much to you?**

I love the directness and logic of it. I grew up programming in assembler code and probably now even think in assembler code. With higher level languages like C you're never quite sure exactly what the underlying processor code is actually doing, and how efficiently it's doing it, whereas with assembler code you know exactly what it's doing and you can optimise it for efficiency.

**Do you think working in assembly language made *Transport Tycoon* and *RollerCoaster Tycoon* better games?**

I've no doubt it enabled a much more detailed level of complexity in the game – much of the simulation side of the game involved a lot of processor workload and needed to be highly optimised otherwise the game would have slowed down too much on even the fastest processors of that era, and achieving that same level of optimisation in a high level language would have proved impossible. The downside of writing in assembler code is that it can't be recompiled to run ▶







▶ on another platform – something that’s caused us considerable problems in the years since the original version of *Transport Tycoon* on the PC. If only someone would write a cross-compiler that could compile x86 assembler code into ARM code – that would be handy!

**How did you come to work with Microprose?**

I had the game probably ninety per cent complete before it was shown to anyone, and then my agent Jacqui at Marjacq showed the game to several publishers. We actually got very close to signing the game to another publisher and then Microprose enticed me down to Chipping Sodbury to visit their offices and meet their staff, and that swung it for me – I felt that they were the right company to publish the game.

**Was there much input from MicroProse?**

I think they did suggest some changes but few made it into the game – either it wasn’t possible to do what they wanted or I was too stubborn! I had quite a clear idea of what the game was, and how to ensure the gameplay worked the best it could, so I wasn’t easily swayed off course. I did put in their suggested references to other Microprose games though – *Submarine*, *UFO*, and a few other hidden things – nothing which affected gameplay, just visual effects.

**After releasing *Transport Tycoon Deluxe* you then went on to make *RollerCoaster Tycoon*; was that something you had planned to do?**

Once *Transport Tycoon Deluxe* was finished I actually signed a deal to create *Transport Tycoon 2*, and worked on it on and off for nearly a year I think before eventually losing interest. I think at the time I was also struggling a bit with adapting to Windows/DirectX development after years of developing under DOS. *Transport Tycoon 2* actually got to the stage of having vehicles moving around, albeit without any decent graphics – I had re-written the isometric game world system to handle multiple levels of bridges and tunnels as this was something I felt that would make *Transport Tycoon* a much more three-dimensional game, allowing elevated railways and maybe even underground systems. I got to the point where I felt I couldn’t carry on with the game though, I was struggling for



» [PC] The sequel focused heavily on the design and decoration of your parks, but added in a ton of extra rides and roller coasters to build, too.



» [PC] Chris only acted as an advisor on *RollerCoaster Tycoon 3* after deciding he had done everything he wanted to do in *RCT2*.

inspiration as it felt like the game wasn’t going to be much of an advance on *Transport Tycoon Deluxe*.

**What inspired you to make *RollerCoaster Tycoon* instead then?**

During the time I was struggling with *Transport Tycoon 2* I started developing an interest in roller coasters – I had never much liked riding them while I was young but now I was becoming interested in their engineering, their design, their visual architectural qualities, and gradually I was beginning to enjoy riding them as well. I bought every book I could find on roller coasters and I joined both the Roller Coaster Club Of

“ Either it wasn’t possible to do what they wanted, or I was too stubborn! Chris Sawyer ”

Great Britain and the European Coaster Club. I visited places like Blackpool Pleasure Beach and Lightwater Valley just to ride the roller coasters. While watching the vehicles moving around on multi-level bridges in *Transport Tycoon 2* I started to wonder what it would be like if those vehicles were roller coasters – would it be fun to build three-dimensional little roller coasters that would intertwine with each other in an isometric game world? I wasn’t really getting anywhere with *Transport Tycoon 2* at the time anyway, so I put the game on hold and I started adapting the code I had already written and within a month or two I had some basic roller coasters going in the game.

**So it was more of a passion project than a particular drive for a commercial idea?**

I had some interesting conversations with a few people in the games industry around this time, mentioning that I was thinking of doing a game where the focus was to build roller coasters, and all the advice was that it would only ever be a niche game, would never make any money, and I’d be much better off sticking to *Transport Tycoon*! I never was very good at listening to advice though, so I made a few decisions – I bought myself out of the *Transport Tycoon 2* contract and effectively cancelled the project, and started working on ‘*Project White Knuckle*’ full time, funding development myself and keeping the project under wraps as I didn’t want to be distracted by people’s negative opinions on the game design.

**As it turns out, it was quite popular. Did you believe that it would be?**

I think by the time *RollerCoaster Tycoon* was eventually published I did have a few hints that it might do reasonably well, but no idea that it would take off quite the way it did. Sales figures back then took a couple of months to come through and it really was quite a shock when we finally saw the first sets of figures and realised how much of a success the game was.

**After *RCT2* you returned to transport again with *Locomotion* – what changed for you to want to return, and why not call it *Transport Tycoon 2*?**

For technical reasons we chose not to use the *Tycoon* label for *Locomotion* but it definitely felt like it was the spiritual successor to the original *Transport Tycoon* games. The *RollerCoaster Tycoon* isometric system gave me a good starting point for going back to a transport-focused game as it was now so far advanced it could cope with more detailed and smoother animation as well as the multi-level “three dimensional” transport routes I wanted to include in previous games. So things kind of went full circle – *RollerCoaster Tycoon* was developed from the ashes of the abandoned *Transport Tycoon 2* project, and now the well-honed *RollerCoaster Tycoon* game engine was then being adapted to create a new transport game.







# FIVE TO PLAY

Chris Sawyer's collection is limited, but hugely important



## STARRAY 1988

■ The first conversion job that Chris Sawyer had, *StarRay* looked and played essentially as you would expect a *Defender* clone to play – and its US name *Revenge Of Defender* made no allusions to its inspiration. It was a difficult job for Chris to replicate the smooth scrolling visuals of the Amiga version on the PC's then inferior hardware but his knowledge and experience with machine code meant he was able to replicate the visuals handily. It never really made headway in the DOS era, however.



## TRANSPORT TYCOON DELUXE 1995

■ The complete version of *TTD* came with improved signals – for complex train systems – as well as a world editor to build and make your own scenarios. The randomly generated terrain, however, meant that it was possible to play for hours trying to perfect your transport systems and maximise profit. Chris admits that the game focused trains rather than the core four transport systems, and truthfully that tended to be how it was played.



## ROLLERCOASTER TYCOON 2 2002

■ Though in many ways the same game as its predecessor, *RCT2* brought in a heap of additions that not only made the game more rich but added in a wide range of roller coaster types. It was – even in Chris's mind – the ultimate version of the game. Every type of coaster – new or old – was accounted for, giving players untold freedom to build exactly what they wanted. The ability to share your coaster creations was an added boon thanks to the game's popularity.



## CHRIS SAWYER'S LOCOMOTION 2004

■ By utilising a similar construction engine as *RollerCoaster Tycoon* and newer, more powerful machines made this the most complete version of *Transport Tycoon* – even if it wasn't named as such. It wasn't as well received as *Transport Tycoon*, though, with most complaints surrounding the UI, but a heap of improvements made for a solid addition to the concept all the same. It's a similar engine that powers the recent *Transport Tycoon* mobile release.



## TRANSPORT TYCOON 2013

■ This was the first project that Chris worked on where he wasn't the sole programmer, but alongside his understanding of isometric design and uncanny programming skills the team at Origin8 were able to create a fantastic port of the original using *Locomotion's* graphics, *RollerCoaster Tycoon's* construction and the same simulation depth as *Transport Tycoon*. Recommended, if you're a fan of mobile retro games.



» [Mobile] The recent mobile has proven to be extremely popular, with excellent touch controls that make it effortless to play.

### Your name was known for simulation games; is that why it was attached to *Locomotion*?

I would have preferred just *Locomotion* as the game's name but due to possible legal issues with using the name on its own like that we were advised to prefix it with my name, which also suited the PR people as they felt it might make it easier to promote the game having my name prominently displayed.

### You chose not to be a large part of *RollerCoaster Tycoon 3's* development, why was this?

When I licensed the rights for the next version of *RollerCoaster Tycoon* to Atari I also made the decision to be very much hands-off for the new game – I completed my vision with *RCT2* and felt it needed someone else to take the game any further. I saw development builds while Frontier were creating *RCT3* and it was exciting to see how the game developed but I didn't have any creative input into the game.

### You stopped making games around this point too, why was this?

I didn't have much enthusiasm for continuing in the industry at that time – the style of games was moving



» [PC] Though *RollerCoaster Tycoon 3* maintained a lot of core similarities to the series, it didn't capture the masses quite as much, both commercially and creatively.

away from what really interested me, and a long-running dispute with the publisher was making it very difficult to focus on anything game-related, or indeed to feel any kind of positivity towards the games industry.

### Were there any challenges in bringing *Transport Tycoon* to mobile?

One of the biggest challenges for the team was trying to get the mobile device's display system to cope with the style of graphics the game needed – for all the power and functionality of the graphics chips on modern hardware it's very difficult to persuade it to do

something it wasn't designed to do, like pixel-mapped graphics rather than polygons or sprites. Another big challenge was how to make the game completely playable with only touches and gestures – especially difficult on a tiny mobile phone screen – while still keeping the depth and complexity of the game.

### Do you think we will ever see *Transport Tycoon* return to PC?

There are no plans for this at the moment as we're completely focussed on mobile platforms but I wouldn't rule it out completely.

