

# AV

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## Red Arrows take off with Fly3D



# Fly with the Red

Miniaturised HD cameras, 3D and computer-controlled motion seating let visitors to the Science Museum experience aerobatic routines 'in' a Red Arrows jet. *Peter Lloyd* went along for the ride

**W**e've all seen them performing their daring aerobatics, but what's it like to fly one of the Red Arrows' Hawk jets during an air show performance? The majority of us will never be in the cockpit, but av technology is now helping us get closer to the pilot's experience than ever before, thanks to a high-definition 3D experience that's newly installed in the FlyZone at London's Science Museum.

It's a thrilling ride that brings home the amazing precision that goes into the Red Arrows' routines, as well as the complexity of piloting a jet in close proximity to other aircraft while performing 9G turns.

Riding the simulator, you experience all the twists and turns (apart from actually turning upside down) and the speed at which the aircraft pass each other – occasionally flashing across your field of vision close in front and at the same height – makes you aware that there's no room for error.

Of course, it's really back-seat driving, and there's an actual pilot in charge, but the Fly3D show is just one of three flight experiences that visitors to the FlyZone can buy into, and the really brave (or foolhardy) can turn themselves inside out in one of the two full-on simulators that have been installed.

## In the zone

'Soft' launched in July and due for a formal inauguration next month, FlyZone is an interactive area on the third floor of the Science Museum that's been installed as a paid-for attraction. It's a joint venture between Metropolis Entertainment – which provided the technology and the content – and the



museum, which provided and engineered the space, and which staffs the attraction.

'We have worked with the Science Museum for many years,' says Metropolis Entertainment technical director Steve Judd. 'The museum worked with us to develop ideas for the gallery, and the Red Arrows theatre idea really sold it.'

However, the gallery isn't just about the Red Arrows. It works on three levels to accommodate the needs and interests of a wide age range, so children up to six or seven years old, who are too small to safely sit in the theatre's motion seats, can watch a 2D version of the film in one of four Red Arrow 'FlyKids' pods. Meanwhile, the most adventurous can fly themselves and a friend in one of two 'Fly 360' full-on simulators, which can be programmed



Red Arrows experience: visitors can feel the twists and turns of the stunts (above) in 3D when they're strapped in to FlyZone seats (centre); kids can watch a 2D version in the FlyKids pods (centre right)

## CONTACTS

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# Arrows - in HD 3D



## INSTALLATION KIT LIST

Metropolis Entertainment sub-contracted installation of the theatre for the show to DJ Willrich, which put in a pair of 1280 x 800-resolution Panasonic DW6300EK projectors with 0.8:1 lenses projecting onto an 8.7m x 4.9m Harkness micro-perforated silver screen. The projectors are fitted with circular polarising filters, rather than the more commonly used vertical/horizontal axis filters, as using a circular filter system (for the glasses, as well as the projectors) allows the stereo images to be seen more clearly when the viewer's head is tilted – as it is once the Stargazer seats are set in motion.

The audio system for the theatre, also installed by DJ Willrich, uses three power amplifiers (a B1500,



Flyzone control screen

an Entero 4100 and an Entero 4200) and Bose speaker systems (three 802s, a pair of DS100SEs, a 502B and an ESP-88).

The video runs from a Media Mation server, which forms part of the simulator control pages.

The audience sits in Stargazer 6 DOF motion-control seats driven by hydraulic rams and a massive hydraulic pump installed behind the scenes. The seats reproduce heave, pitch, roll, surge, sway and yaw movements. Control is remoted to the ticketing and reception desk, where the staff have access to a touch screen that shows seat status – to make sure everyone is belted in – as well as management functions.



view rushes and check the stereo separation was OK) and Apple's Final Cut Pro to conform the offline edit at Pinewood-based 3D specialist facility Pablo Post. The introduction with Red Arrows leader Ben Murphy and the graphics were also added at this stage.

## Reality check

Creating the 'in cockpit' Fly3D experience has been made possible thanks to advances across a whole range of technologies – including camera miniaturisation, HD projection and computer-programmed seating – and it's as close, for now, as members of the public are going to get to the real thing.

The Science Museum and Metropolis Entertainment have worked together in the past on experiential installations – including the museum's Force Field 4D effects theatre and the Legend of Apollo 3D film that have been operating in Kensington for some time – but Fly3D takes the technology (and the business case) a stage further.

It's no wonder that Metropolis sees the future of this kind of simulation and entertainment in areas such as corporate branding and museums, rather than the 'end of pier' activity that characterises early simulator enterprises.

That's partly, one suspects, because the experience has become more realistic and less overtly sensational. Fly3D certainly is. According to Red Arrows pilot Flight Lieutenant Mike Ling, who helped the production team programme the simulation, the show is about as close as anyone will get to actually flying in the back seat of a Red Arrows Hawk jet without leaving the ground. 'The motion cues are very accurate and the 3D visuals are just sensational,' he says. And if anyone should know, he should. ■

to replicate fighter aircraft. And there's also a café area from which to watch the action.

However, it's the theatre that's the centrepiece, allowing the audience to get a pilot's eye view of a Red Arrows flight. Once visitors are strapped into one of the Stargazer seats, there's a brief introduction and then it's flight time – looking through the front of the cockpit canopy while the plane takes off, climbs, banks, dives and rolls its way through an air show.

The combination of 3D and HD heightens the realism, while the seats mean that the audience gets an authentic feel of the way the plane is rolling, yawing and turning – although they escape the G-force effects and have to rely on their visual senses to tell them when they are flying upside down.

## Content creation

Producing the content was a feat in itself, and director Bob Hayes stresses the enormous amount of co-operation that Impact Image, the production company commissioned to make the movie, received from everyone concerned – including

The Red Arrows, the RAF and the MoD, as well as the engineering teams from the aircraft manufacturers.

To get the pilot's eye view, Impact Image had to remove the rear ejector seat from the cockpit of one of the Hawk jets and install a stereo camera rig (complete with flash memory recorders and a genlock controller) that had to replicate the weight, balance and centre of gravity of the seat that was taken out.

Hayes and his team used a pair of 1930 x 1280-resolution Cunima cameras – which weigh in at just 180g each and use two-third inch CMOS chips linked to control circuits developed by the German Fraunhofer Institute – so that there was no need for an external camera control unit.

The camera and recorder systems were installed on the special mounting rig for a series of flights carried out from Cyprus' Akrotiri air base during May, when the Red Arrows were working on their routines before the start of their summer schedule.

The resulting material was then edited into a 'compilation' flight using Premiere Pro on site (to