Flights Of Fancy

Being able to simulate the complete functioning of a complex airliner or military plane means that pilots can receive most of their training on the ground

Cleared For Take-Off
'Bravo Alpha three two five, you are cleared for take-off on runway one two. Wind speed is one five knots, bearing one zero five. Call me when you are passing one thousand metres.'
But the runway in front of this Boeing 737 exists only as digital pulses inside Rediffusion's Novoview SP3 flight simulation computer system

As early as the 1940's, aeroplane pilots received some initial training not in real aircraft but in stylised mock-ups known as Link Trainers. Representing the first generation of flight simulators, these were fairly crude machines that set out only to give some idea of the effects of the aircraft's controls, and their purpose was to teach basic flying skills.

With the introduction of the first generation of multi-engined jet airliners such as de Havilland's Comet, it became apparent to airline operators that they would need a safer and more economical way of teaching their pilots to fly different aircraft types, other than actual in-flight training. Electronics manufacturers responded by producing the first computer-controlled simulators, using both analogue and digital techniques.

Mounted on hydraulic rams, these simulators replicated the cockpit sections of the craft that trainees were learning to fly. Computer control of the hydraulics systems allowed the mock-up to respond to movement of the flight controls just as the real aircraft would, and also allowed the instructor to set up 'emergency' situations.

The cockpit interior was an exact copy of the real thing, with complete instrumentation and a full set of controls. These controls were not only designed for the pilot, but for the entire flight-deck crew, since by this time it had become vitally important that the crew work as a team.

The only missing element was a simulation of the view that the pilot would have through the windscreen on take-off and landing. The first attempts at this centred on projected film, but the difficulties of constant re-orientation made this a far from perfect solution.

As so often seems to happen, the problem became really pressing at about the time that a solution was being proposed in another branch of technology. We have examined how Computer

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Planes On Legs
From the outside, flight simulators look like nothing more than rather odd-shaped boxes on angled hydraulic stilts. Once inside, however, you enter a completely different world — the flight deck of a modern aircraft