

**IntelliBuild**  
BIM + 3D Consultants

“ With BIM, you create a very powerful construction tool – it saves time and money during building works. ”

Ir.Ronan Collins, Managing Director,  
*IntelliBuild*



# THE MOST SOPHISTICATED BIM MODEL

**Project:** Cathay Pacific Cargo Terminal

**Location:** Hong Kong International Airport

**Type:** Air Cargo Terminal Building

**Scheduled for completion:** 2011

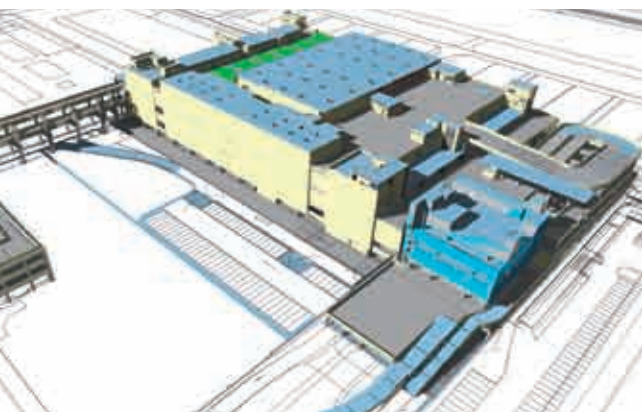
The world's largest air cargo terminal building is taking shape at the Cathay Pacific project office. Taking shape as a 4D Revit model, that is. "This is the first cargo terminal we are aware of that's being built using this technology," says Ir. Collins, Managing Director of InteliBuild. He shows the exterior of the terminal, sweeps the camera in to enter the building, and reveals an intricate assembly of material handling systems, piping, cargo bays, truck docks and stairwells.

"It's probably the most sophisticated 3D CAD model in the industry," says Ir. Collins.

## Huge, ambitious project

The Cathay Pacific Cargo Terminal is designed to maximize usage of the site area of approximately 10 hectares. With a floor area of 260,000 square metres – exceeding the floor area of Two International Finance Centre – it will be the largest cargo terminal in the world based on cargo through-put per square metre.

Equipped with a state-of-the-art Materials Handling System (MHS), the terminal will deliver shorter cargo delivery times, reduced cut-off times for export cargo, a shorter trans-shipment connection window and shorter truck queue times, to sustain the competitiveness of Hong Kong as a leading cargo hub.



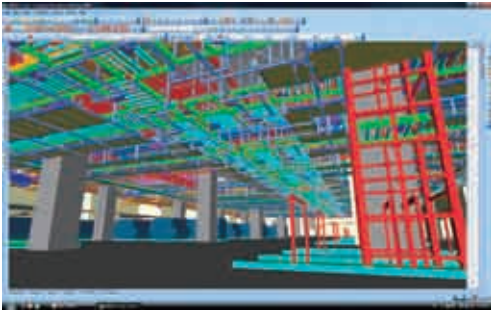
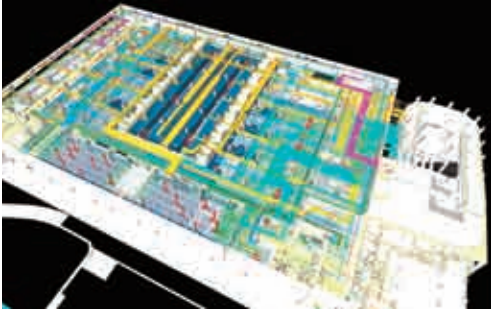
## Using full-blown BIM

Ir. Collins started IntelliBuild in 2003, after gaining experience in 3D modelling, initially as a structural engineer. The Cathay Pacific Air Cargo Terminal is the first project for which IntelliBuild is using what he terms “full-blown BIM”, involving multi-disciplinary coordination, with all of the MHS, structure, architecture and building services in the BIM model.

## Managing the entire building process

Ir. Collins has been closely involved in the evolution of 3D and 4D modelling for building construction, and has found that much depends on clients, who might only fully appreciate the benefits of BIM once they have used it.

“BIM involves a paradigm shift within the building industry,” says Ir. Collins. “You have to educate the architects and engineers, and clients must specify increasingly involved processes. With BIM, you can manage the entire building process.”



“There's an envelope of space within the terminal, such as headroom of 4.7 metres for trucks,” says Ir. Collins. “We model the spatial envelope, and make sure there are no pipes and ducts along the truck routes.” Cargo containers are different shapes and sizes, and there are maximum envelopes in different areas – sometimes two inches clearance might be required, sometimes four inches. Using the model, the design team can determine whether clearances in the design meet the client's operating requirements.

### **Teams seconded to client offices**

Managing even partial adoption of BIM is complex, and IntelliBuild employ small, specialised teams who are seconded to client offices, working on aspects such as protocols for naming the multitude of computer files each project generates. A five strong team works full time on the BIM for the cargo terminal, coordinating with the client, project managers, architects, structural engineers and building services engineers from Meinhardt.

### **Modelling the envelope of space**

“The cargo terminal design starts with the MHS equipment,” explains Ir. Collins. “You then wrap concrete structures around it, and add the architecture, including offices, and the MEP – the ducts, pipes and electrical systems.” All the design information is input to the BIM database, which can then be used to ensure the actual construction will be clash-free.

### **Identifying potential coordination problems**

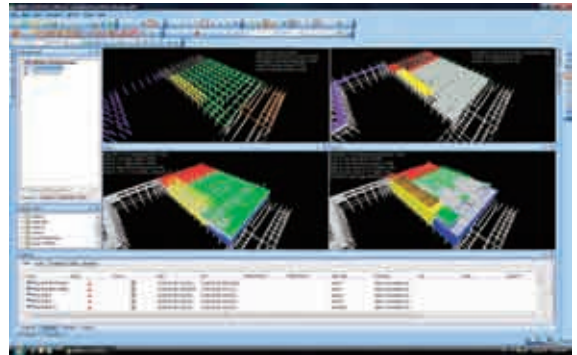
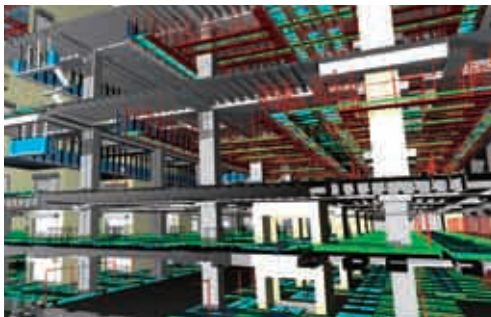
The BIM process is used to identify a host of potential coordination issues, such as where a pipe will hit a beam, and explain them to the designers, who can revise the designs accordingly. “By employing BIM, construction will produce less waste, as there will be less demolishing and reworking,” says Ir. Collins. “We find errors with simple things, like equipment pits that are not the right size.” He zooms into the model, and shows a cargo bay where Navisworks had flagged a pit that might have looked fine on 2D drawings, but was actually too small.

## A 3D model everybody can understand

“With 2D drawings, you require interpretation,” says Ir. Collins. “But with a 3D model, you can see where there’s a clash – everybody can understand it, and see problems much, much faster, and get on with the design.” By linking the 3D model to the planned construction programme, the IntelBuild team has produced a 4D model that will help throughout the entire construction process, including by assisting the specialised MHS contractors.

## Layers and layers of information

Ir. Collins says the cargo terminal model includes layers and layers of information. In just moments, he can choose to show the building’s basic geometry, add structure such as walls and ceilings, and progress to interior views complete with ducts and pipes. Plus, there’s a clash matrix generated by analytical software. The Revit and 3D CAD models are also being used for quantity take-offs.



## Over 3000 linked and coordinated drawings

Thanks to the database being so comprehensive, Revit has been used to produce 760 architectural drawings and 845 structural drawings. Additionally, Autodesk MEP has been used to produce more than 1600 building services drawings. All these drawings are linked and coordinated.

## Significant cost savings and construction on time

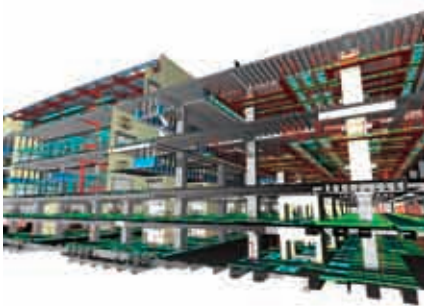
Though employing a specialised BIM team can be an extra cost for a project, Ir. Collins says the fees are insignificant compared to construction costs. Plus, BIM delivers significant benefits, including saving money and time. “Saving five percent of construction costs is feasible and well documented,” he says. Using BIM to streamline operations, construction projects are more readily completed within time, and within budget.



# IntelIBuild

BIM + 3D Consultants

## ABOUT INTELIBUILD



IntelIBuild are BIM + 3D Specialists. Experienced professional engineers and knowledgeable 3D CAD technicians collaborate to produce precise digital models for construction projects. The multi-disciplinary BIM models are used to identify design clashes and co-ordination issues. When combined with building programmes to create 4D models they can demonstrate site logistics and assist with construction planning.

IntelIBuild are responsible for planning and implementing BIM processes on fasttrak projects in collaboration with the client, consultants and contractors. Their BIM Managers are experienced in training Architects, Structural and Building Services Engineers on how to use the BIM process to improve design integration and drawing production.