NUCLEUS

3D Unified Management System for Smart Buildings and Cities

Buildings and cities today are increasingly interconnected with sensors providing real-time information for security, facility, environmental and enterprise management applications. The exponential rise in the number of installed sensors brings out the challenge of real-time situation awareness to city and building managers i.e. the challenge of swiftly and correctly interpreting the real-time data avalanche, making decisions and responding to real-time situations.

NUCLEUS is the **award-winning** 3D unified management system that provides you with the most comprehensive situation awareness for your smart buildings and cities.
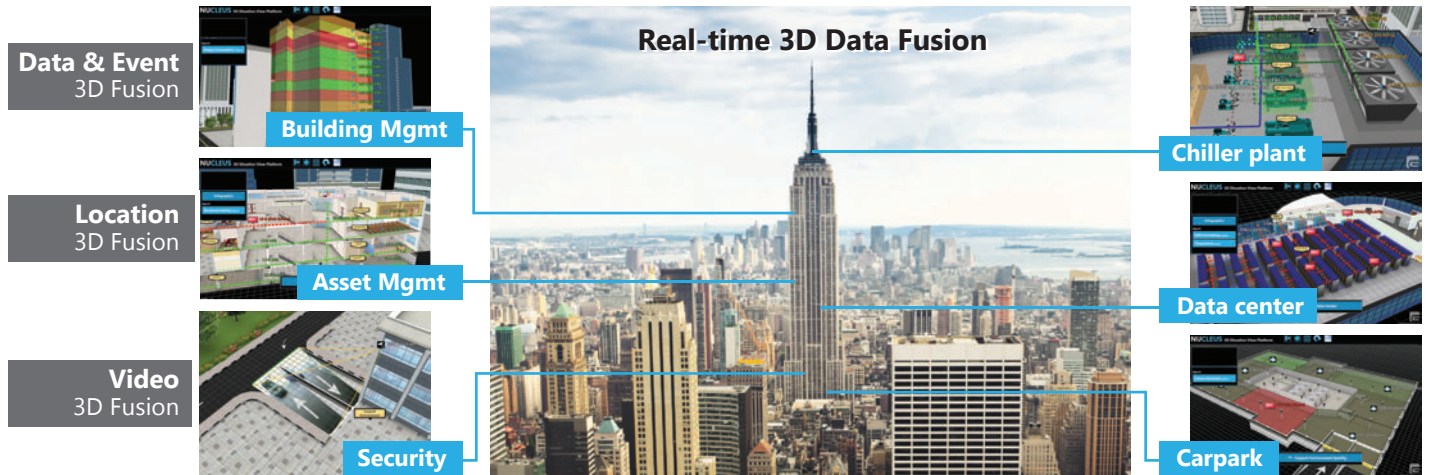
www.nucleussense.com

3D Unified Management System (UMS)

NUCLEUS helps building and city managers to achieve comprehensive real-time situation awareness in a single, unified view, providing unified situation awareness in the following ways:
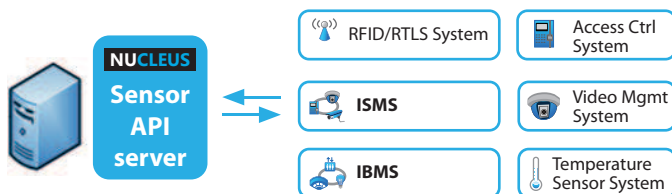
Unified Situations

Enabling smart fusions that integrate real-time data, analytics, videos, locations and events with 3D environments to provide unified 3D situation visualization and management for different functions and facilities of the smart building/city.
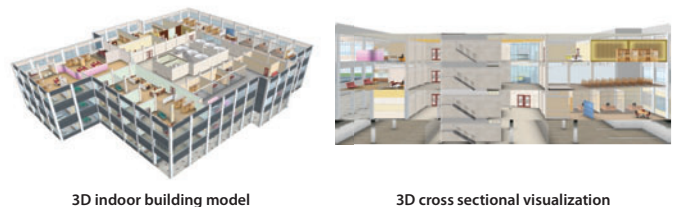

Data & Event 3D Fusion

Location 3D Fusion

Video 3D Fusion

Building Mgmt

Asset Mgmt

Security

Real-time 3D Data Fusion

Chiller plant

Data center

Carpark

Unified Systems

Unifying different "best-of-breed" sensor systems via NUCLEUS's open sensor API as a neutral platform.

NUCLEUS
Sensor API server

RFID/RTLS System

Access Ctrl System

ISMS

Video Mgmt System

IBMS

Temperature Sensor System

Unified Maps

Converging all disparate plans and drawings into one single 3D building/city model which managers interact with.

3D indoor building model
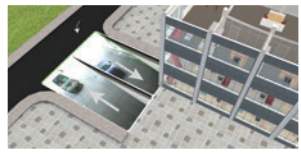
3D cross sectional visualization

Benefits of NUCLEUS 3D UMS

1 **ONE Unified 3D Model** to monitor the entire premise, instead of 10-100s of 2D maps to monitor. Improves location interpretation and avoids errors in communicating locations.

2 **Immediate Situation Sense-making**. NUCLEUS fuses real-time sensor and 3D building information in one unified view for quick situation insight and informed decision-making.

3 **Enhanced Situation Management/Response**. NUCLEUS enables quick on-demand retrieval of 3D building model and device information for situation understanding, and provides easy tools to visualize 3D indoor building layouts and annotate/plant 3D asset objects for situation response planning.

4 **Direct Situation Communication/Co-ordination**. Enables managers to vividly coordinate and brief situations and response plans through 3D situational display and direct 3D multi-touch user interface.

5 **Enables Optimal System Design**. Premise owners are able to achieve "best-of-breed" integrations for their system design. System Integrators are able to deliver target system design at lower costs via NUCLEUS, compared to R&D costs in direct integration.

6 **Open Integration Platform**. NUCLEUS's open integration platform enables future upgrade scalability and extensibility.
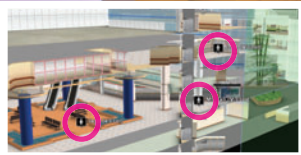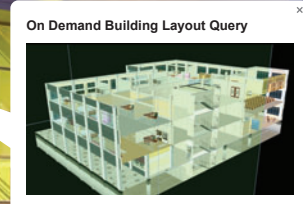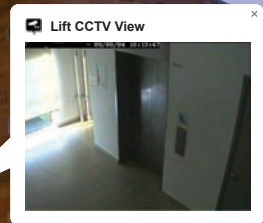
Product Features

Safety & Security Integrations

Lift CCTV View

Building & Facility Management Integrations

Enterprise Tracking Application Integrations

On Demand Building Layout Query

Features Summary

■ Standard Application Feature ■ Advanced Application Feature

> **Building Visualization & Control**
- 3D indoor building rendering
- 3D outdoor city rendering
- 3D cross-sectional visualization
- Multi-level building control
- Optimized 3D building load caching with progressive texture loading

> **General Administration**
- Multiple 3D site management
- Multiple site profile management
- User account and access management

> **3D Situation Management**
- Real-time device/event management
- Supports definition of event-based 3D behaviour and SOP information
- On-demand device query/control
- NUCLEUS Sensor API and interface (unifiable with third-party IP-based systems e.g. VMS, BMS, ISMS, RTLS)
- Device/site information search

> **Advanced User Interface**
- Easy-to-use web browser interface
- 3D multi-touch control

> **3D Situation Annotation/Planning**
- 2D/3D object placemark management
- Planning module

> **3D Situation Visualization**
- 3D data and event fusion
- 3D location fusion
- 3D bookmark view management
- Interactive orbit-mode navigation
- Interactive measurement tools
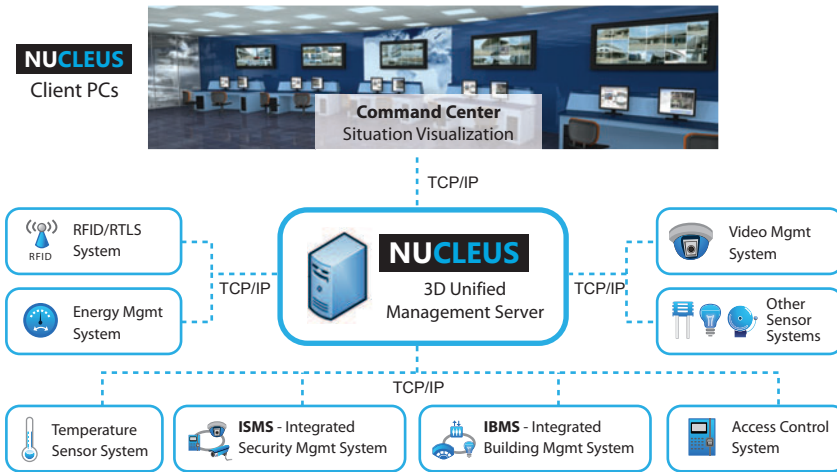- 3D video fusion
- Smart tour module

NUCLEUS Platform Server Software Editions

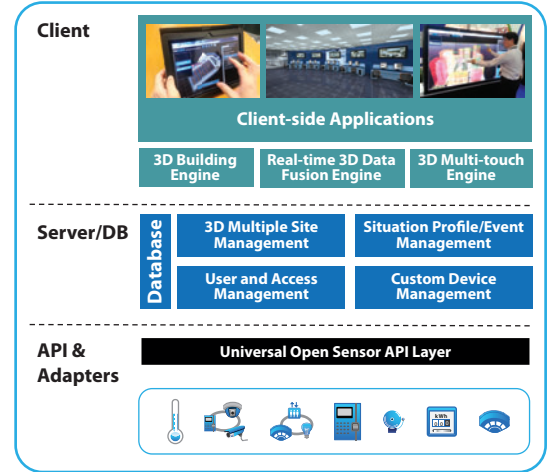| Features Comparison	Essential	Esteem	Enterprise
Standard application features (refer to Features Summary ■)	**Included**	**Included**	**Included**
Additional feature - 3D multi-touch control (refer to Features Summary ■)	Has support *purchased additionally*	Has support *purchased additionally*	Has support *purchased additionally*
Additional feature - Planning module (refer to Features Summary ■)	Has support *purchased additionally*	Has support *purchased additionally*	Has support *purchased additionally*
Additional feature - Smart tour module (refer to Features Summary ■)	No support	Has support *purchased additionally*	Has support *purchased additionally*
Max. number of 3D site licenses	10	50	200
Max. number of device placemark licenses	<100	<500	<10000
License type	Commercial	Commercial	Commercial
Default Configuration			
Default config for 3D site licenses	1	1	1
Default config for device placemark licenses	20 [1]	100 [1]	500 [1]

[1] Set as any combination of passive, active or object placemarks at the point of sale.

Technical Architecture

NUCLEUS can either be deployed as a 3D unified management system integrating all your sub-systems (e.g. VMS, ACS, RTLS, etc.) or as a 3D unified HMI (Human Machine Interface) integrating to an existing integrated management system (e.g. ISMS, PSIM or IBMS). Please refer to the integration architecture diagram below :
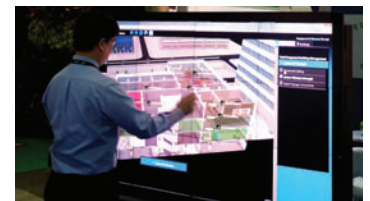

Deployment Architecture Diagram

NUCLEUS
Client PCs

Command Center
Situation Visualization

TCP/IP

RFID/RTLS System

Energy Mgmt System

TCP/IP

NUCLEUS
3D Unified Management Server

TCP/IP

Video Mgmt System

Other Sensor Systems

TCP/IP

Temperature Sensor System

ISMS - Integrated Security Mgmt System

IBMS - Integrated Building Mgmt System

Access Control System

Modular Architecture Diagram

Client

Client-side Applications

| 3D Building Engine | Real-time 3D Data Fusion Engine | 3D Multi-touch Engine |

Server/DB — Database

| 3D Multiple Site Management | Situation Profile/Event Management |
| User and Access Management | Custom Device Management |

API & Adapters

Universal Open Sensor API Layer

Target Applications

NUCLEUS can be deployed for command center use or as an interactive management dashboard for top management of buildings and cities. Its primary deployment are in applications requiring advanced 3D situation awareness, such as unified building/city management, security management, facilities management and enterprise resource management, for different building types, such as:

> Intelligent office buildings/business parks
> Hospitals and healthcare premises
> Hotels and resort clubs
> Convention and exhibition centers
> School, university campuses
> Major sporting venues

> Shopping malls and marketplaces
> Airports, train stations, cruise terminals
> Water/power plants, oil & gas facilities
> Military camps and prisons
> Protected landmarks designated by police/fire agencies

Touch-interactive Management Dashboard

Corporate Information

Founded in 2001, G Element is Asia's leading software company in developing 3D solutions for smart buildings and cities, enabling smarter high-level management of buildings and cities for our clients so as to achieve optimal efficiencies in building security, operations and workflows.

Headquartered in Singapore, G Element has built up a strong distribution network and presence all over Asia and the Middle East, in countries such as Singapore, Malaysia, Thailand, Indonesia, Hong Kong, South Korea, U.A.E., and China. Our 3D solutions have been deployed in commercial buildings, hospitals, government facilities, academic institutions, exhibition centres, major events, concept islands and city districts.

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