



## - 3D FIRE & GAS MAPPING SOFTWARE



IRES C has expert knowledge in F&G Mapping Guidelines including Shell Guidelines, BP Guidelines, PTS Standards, NFPA Standards, ISA-TR84.00.07, etc. More importantly, with this engineering knowledge & experience, IRES C has developed a fully 3D Fire & Gas Mapping software (FIGCO). FIGCO provides practical, fit-for-purpose solutions to maximize fire and gas detector coverage in any given facility.

### How can enhance your performance?

Perform full 3D mapping study for flame, flammable gas and toxic gas detectors to:

- Optimise the number of detectors
- Optimise layout of the detectors
- Achieve desired performance targets
- Locate detectors at accessible and maintainable areas
- Accurately identify areas with reduced or no coverage
- Achieve optimal & fit-for-purpose solutions that provide a balance between safety, required performance, availability and cost.





## Software Overview

## Industry Sectors

- Fully 3D Fire & Gas Mapping software.
- Compatible with all 3D models in the industry.
- Import 2D Plot Plan & compare it directly with 3D model.
- 3D Coverage plots
- Export project summary table in excel format.
- Export detailed analysis report in pdf format.

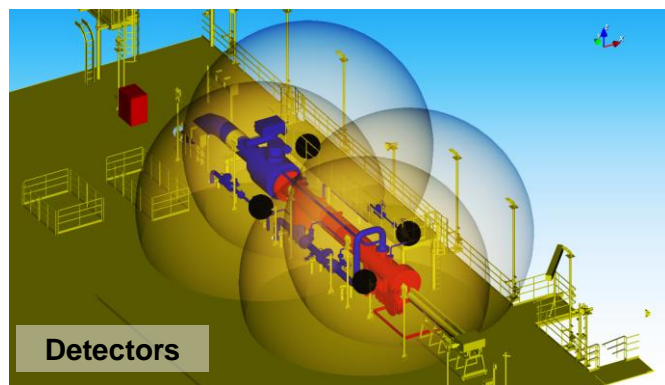
- Exploration & Production
- Oil & Gas Processing
- Oil & Gas Storage
- LNG
- Refineries
- Petrochemicals
- Polymers
- Chemicals/ Fertilizers
- Pipelines
- Road/ Marine Transport

## 3D Geometry Model Compatibility of



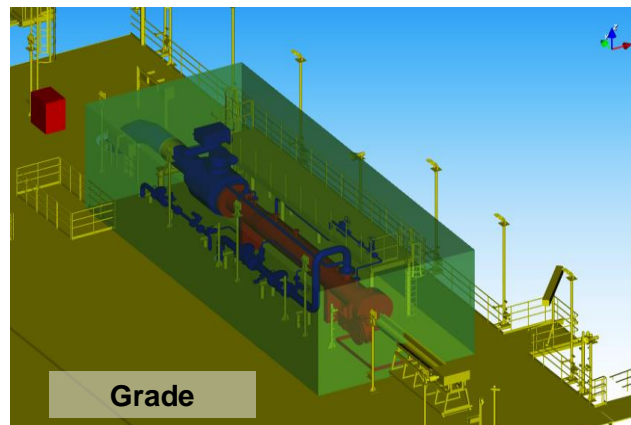
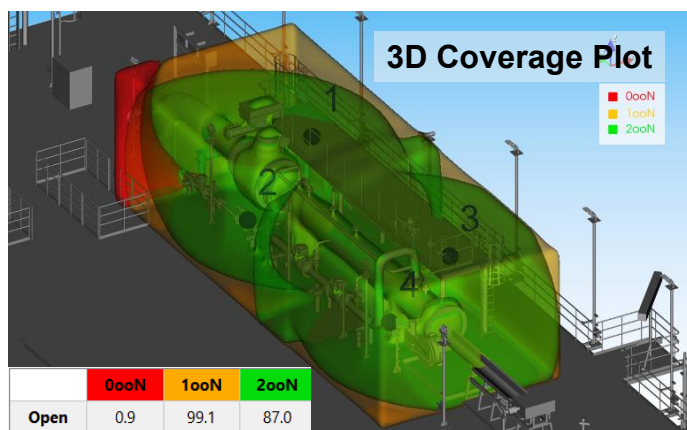
CATIA v4 (\*.model;\*.session;\*.exp;\*.dlv3)  
 CATIA v5 (\*.CATPart;\*.CATProduct;\*.cgr)  
 CIS/2 (\*.stp)  
 MicroStation Design (\*.dgn;\*.prp;\*.prw)  
 DWF (\*.dwf;\*.dwfx;\*.w2d)  
 Autodesk DWG/DXF (\*.dwg;\*.dxf)  
 FBX (\*.fbx)  
 IFC (\*.ifc)  
 IGES (\*.igs;\*.iges;\*.ige)  
 Inventor (\*.ipt;\*.iam;\*.ipj)  
 JT (\*.jt)  
 NX (\*.prt)  
 OBJ (\*.obj)  
 Parasolid (\*.x\_b;\*.x\_t;\*.xmt\_bxt)  
 Proj/ENGINEER (\*.prt;\*.asm;\*.g;\*.neu\*)  
 Autodesk ReCap (\*.rcs;\*.rcp)  
 Revit (\*.rvt;\*.rfa;\*.rte)  
 Rhino (\*.3dm)  
 RVM (\*.rvm)  
 SAT (\*.sat;\*.sab;\*.smt;\*.smb)  
 SketchUp (\*.skp)  
 SolidWorks (\*.prt;\*.sldprt;\*.asm;\*.sldasm)  
 STEP (\*.stp;\*.step;\*.stpz;\*.ste)  
 STL (\*.stl;\*.stla;\*.stlb)  
 VRML (\*.vrl;\*.wrz)  
 SmartPlant 3D (\*.vue)  
 All Navisworks Files (\*.nwd;\*.nwf;\*.nwc)

Wide variety of 3D models that  
can be imported to FIGCO

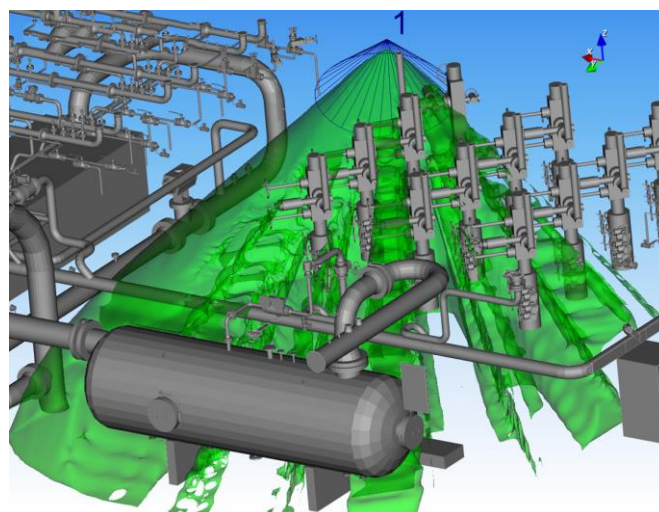
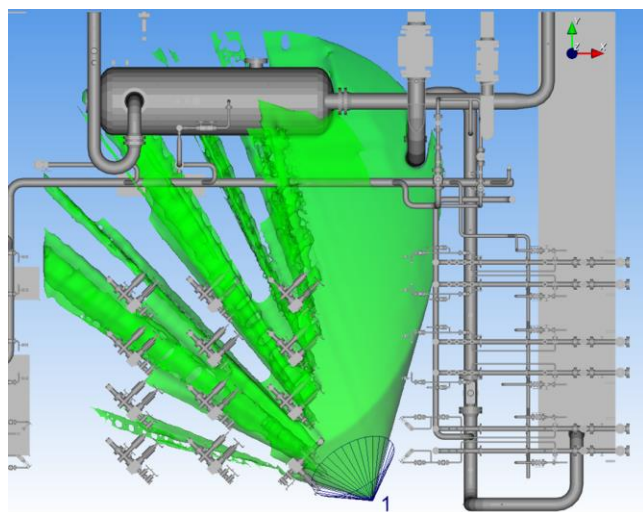


## Special Features of

- Fully Flexible in terms of assessing different voting logics.
- Fully customizable to match detector parameters based on the data sheet and performance target based on standards.
- Generation of easy-to-interpret colour coded 3D coverage maps overlaid on equipment layouts for convenient visualisation and optimization.
- Tabulated coordinates for the recommended detector locations in terms of x, y and z coordinates and, for flame detectors, the horizontal rotation (yaw) angle and vertical tilt.
- Flame Mapping analysis is suitable for IR, UV, and CCTV type detectors.
- Gas Mapping analysis using point type, open path detectors or a combination of both.
- Easily account for cross credit from different types of detectors in the same zone.



## Flame Mapping Assessment

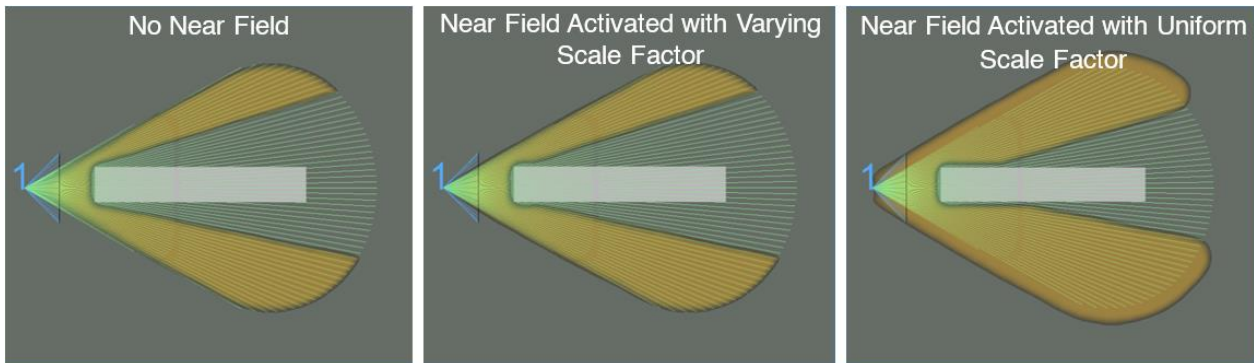


**Obstructed Line-of-Sight of Fire Detector**

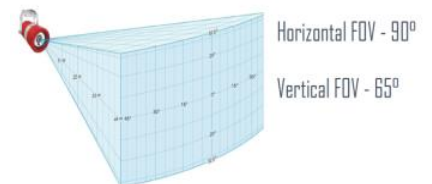
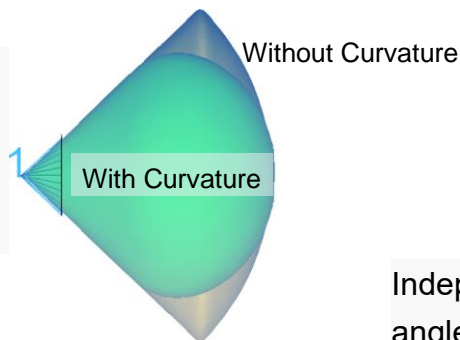


## Flame Mapping Assessment (Continued)

Near-field coverage modelling helps determine accurate and realistic fire detector performance.



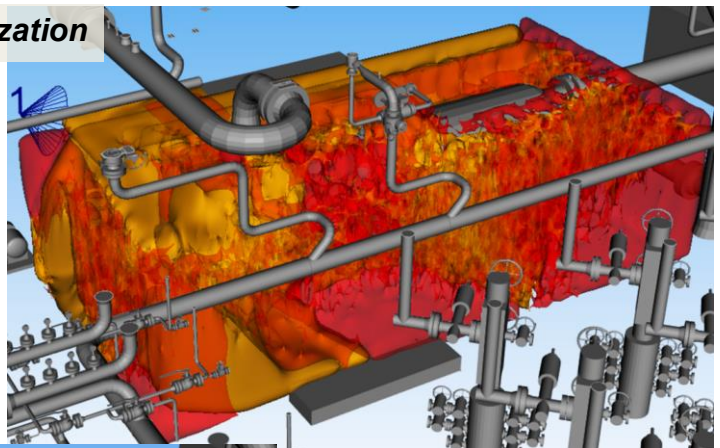
Roll-off (Curvature) at the periphery of the vision cone models realistic fire detector performance



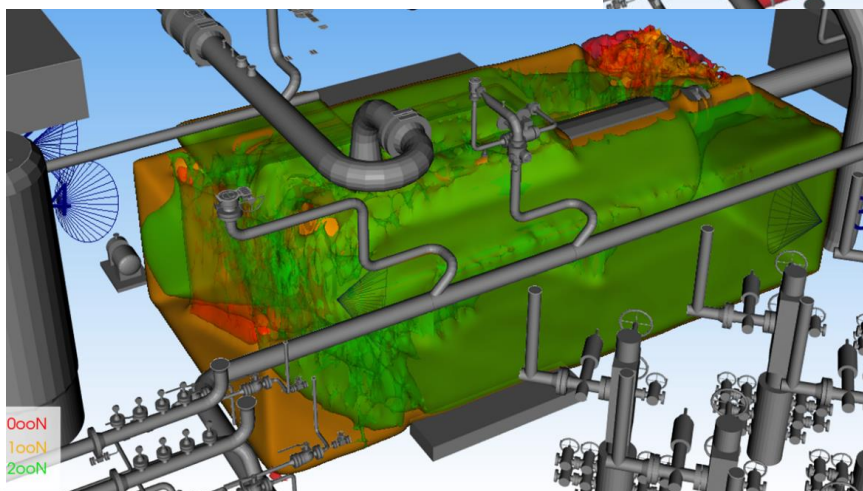
Independent Horizontal and Vertical angles in Flame Detector's field-of-view

### Before Optimization

- Green** 200N regions - both alarms and control actions generated (if any)
- Orange** 100N regions - alarms generated but no control action initiated
- Red** 000N regions - No coverage

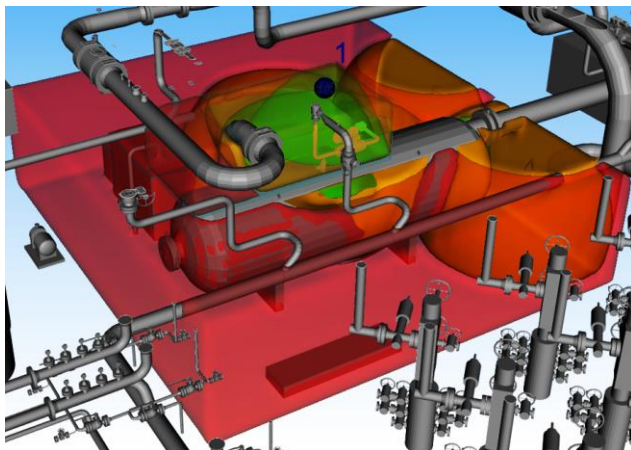


### After Optimization



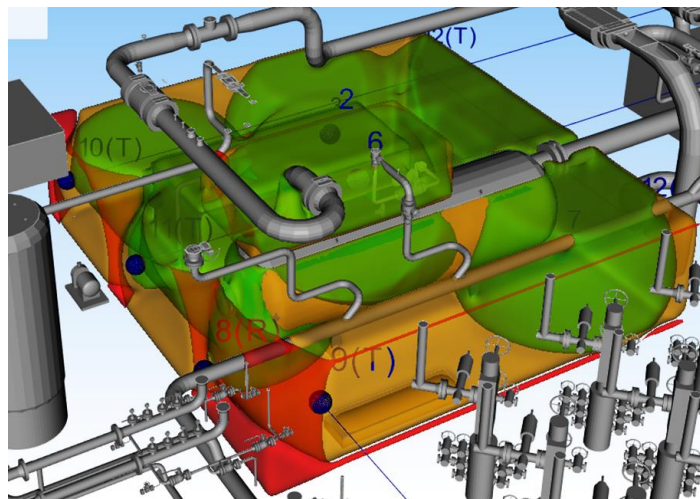
## Gas Mapping Assessment

### Before Optimization



- Green** 200N regions - both alarms and control actions generated (if any)
- Orange** 100N regions - alarms generated but no control action initiated
- Red** 000N regions - No coverage

### After Optimization using combination of **Point Type** and **Open Path Gas Detectors**



## Fire and Gas Mapping Publications using

- **Optimizing Fire & Gas Detection Coverage and Layout using 3D Mapping Tools**, 2017 Mary Kay O'Connor Process Safety Center International Symposium, Texas, United States
- **Establishing Minimum Requirements For Fire And Gas Detection For Process Facilities**, Hazards Australasia 2013, Perth, Australia

## Global Projects Performed using

- **ENOC Jebel Ali Refinery Expansion Project**, Dubai for Technip Italy S.p.A. (TPIT). Units covered: CDU, Hydrotreaters (Naphtha, Kerosene and Diesel), LPG Fractionation, SRU, ARU, SRU.
- **PVGAS Ca Mau Gas Processing Plant Project**, Vietnam for POSCO Engineering.
- **Petronet Dahej LNG Terminal Project**, India. Development of 3D Model for existing facility through onsite laser scanning and performing 3D mapping using the model developed.
- **Singapore LNG Terminal – Phase 3 Expansion Project**, Singapore for Fluor Corporation.
- **BP Tangguh Expansion Project**, Indonesia for PT. Saipem Indonesia. Study covered two Well Head Platforms (WHP).
- **KNPC Clean Fuels Project Mina Al Ahmadi (MAA) Refinery**, Kuwait for JGC Corporation, GS E&C and SK E&C JV. Units covered: ARDS, SRU, CCR, VRU, FCC Naphtha Hydrotreater Unit, DCU.



- **PETRONAS Yetagun Phase V Development Project**, offshore Myanmar for Larsen & Toubro.
- **PETRONAS LNG Train 9 EPCC Project**, Malaysia for JGC for LNG Liquefaction Train.
- **Gazprom Badra CPF Phase 2 Project**, Iraq for Samsung Engineering. Units covered: gas treatment, fractionation & compression, SRU, LPG recovery, storage & truck loading etc.
- **Groupement Timimoun Field Development Project**, Algeria for Samsung Engineering.
- **PETRONAS Gas Treatment Plant Onshore Gas Terminal (GTPOGT) Expansion Project**, Turkmenistan for Hyundai Engineering.
- **PTT LNG Receiving Terminal Expansion Project Phase II**, Thailand for POSCO Engineering.
- **PETRONAS Terengganu Gas Terminal (TGASt) Project Phase 2**, Malaysia for Samsung Engineering.
- **GSPC Mundra LNG Terminal Project**, India. Two-stage assessment (i.e. preliminary review of F&G detectors layout and detailed review of 3D model).
- **South West Gas Fields Development Project**, Algeria for L&T Hydrocarbon Engineering (LTHE).
- **Do Terminal Hejre Crude Stabilisation Project**, Dong Energy, Denmark for CB&I.
- **Refrigerated Gaseous Tank Facility (RGTF) for Pengerang Deepwater Terminal 2 (PDT2) Project**, Pengerang Terminals (Two) Sdn. Bhd. (PT2SB), Malaysia for Chiyoda Malaysia Sdn. Bhd.
- **Mixed Feed Cracker (MFC) Project**, Korea for GS Caltex Corporation.
- **KNPC Clean Fuels Project - Mina Al Ahmadi (MAA) Refinery**, Kuwait for Daelim Industrial Co., Ltd.
- **KNPC New Refinery Project (NRP), Kuwait.**
- **ABS-Biodiesel Plant Project**, Hong Kong for ABS Biodiesel Plant (Hong Kong) Limited.
- **SABIC UNITED EO/EG III Project**, Jubail Industrial City, Kingdom of Saudi Arabia for Samsung Engineering Co. LTD., (SECL).
- **Do Terminal Hejre Crude Stabilisation Project**, Dong Energy, Denmark for Do Terminal Hejre Crude Stabilisation Project.
- **HURL Ammonia Urea Fertilizer Project**, India for Toyo Engineering Corporation, Japan (TOYO) and Toyo Engineering India Private Ltd. (TEIPL) Consortium.
- **Asset Development Plan 1 – PRU and O&U Unit Project** (conducted using 2D mapping assessment), Nayara Energy Ltd (NAYARA), India for TEIPL.
- **PTTGC Olefin Reconfiguration Project**, Thailand for Samsung Engineering Co. Ltd.
- **PTTGC Olefin Reconfiguration Project - OSBL scope**, Thailand for TTCL Public Company Limited.
- **PTTGC Propylene Oxide Project**, Thailand for Samsung Engineering Co. Ltd.
- **SHWE Field Development Project**, Myanmar for POSCO International Corporation.
- **BP Tangguh Expansion Project (offshore Gas Processing Facilities) – Well Slot Relocation**, Indonesia for PT Saipem Indonesia.

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