



GAMMA
TECHNOLOGIES

OIL & GAS SOLUTIONS

Engineering Confidence Through Simulation

FROM EXPLORATION TO RECOVERY

The oil and gas industry is constantly being challenged to improve production by optimizing performance and incorporating new technologies while simultaneously managing environmental risks and expenses. Whether it be for upstream, midstream, or downstream activities, a strong front end engineering design (FEED) is needed to address challenges like pipe leakages, system breakdown, risk assessment, storage, transport, electrification, carbon capture, and others.

GT-SUITE is a simulation platform that assists engineering positive displacement pumps and compressors that support activities such as drilling, production, and fuel transportation. Our simulation solutions also help to develop IC engines as well as newer technologies through electrification and fuel cells for light, medium, and heavy-duty applications. Operational efficiency can be improved with internet of things (IoT) and digital twins within GT-SUITE.

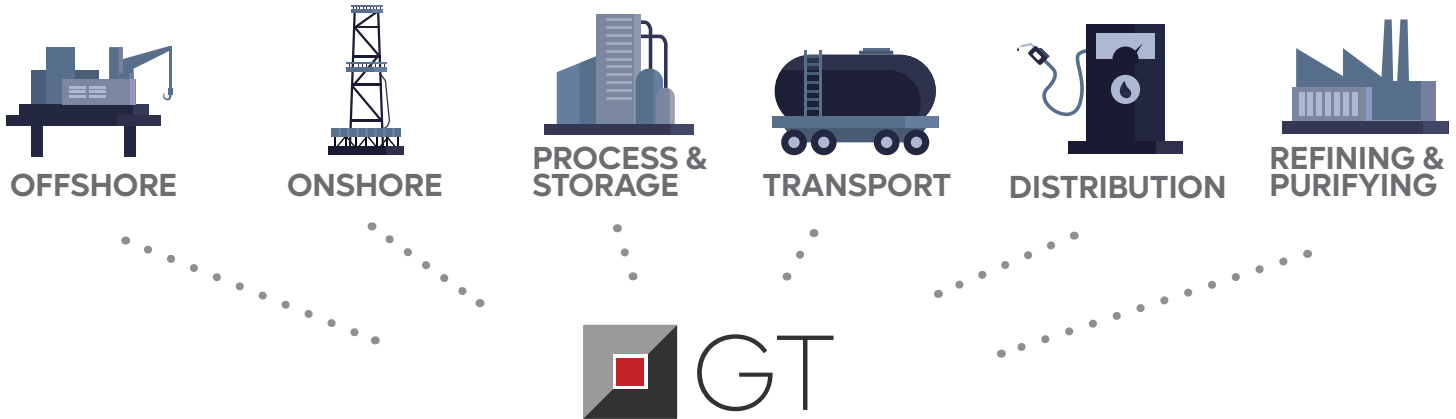
PUMP AND COMPRESSOR MODELING

Pumps and compressors are essential to the oil and gas industries from exploration and recovery until delivery. GT-SUITE provides modeling solution for various compressors and pumps ranging from positive displacement to variable displacement machines. Our simulation solutions have the flexibility of using various fluids like gas, liquid, refrigerant and two-phase with injection. Along with this, GT-SUITE has the capabilities of automated model building, mapped based modeling, standalone modeling and system integration. Key predictions include: performance, flow and pressure pulsations, friction, bearing performance, NVH (noise, vibration, and harshness), and more.



SOLUTIONS FROM THE FIELD TO THE CONSUMER

From onshore pumping to storage and distribution, GT has simulation solutions to improve efficiencies.



ENGINE MODELING

Internal combustion engines are required for numerous applications such as running a pump or a compressor supporting generators for power generation, driving vehicles for transportation, and more.

GT-POWER provides industry standard engine simulation to predict necessary performance quantities. Physics-based models calculate cylinder emissions, lubrication oil friction, and control system modeling. A finite element (FE) solver computes in-cylinder temperature and heat flux distribution, as well as complete, fully flexible, detailed in-cylinder chemical kinetics solvers capabilities included at no extra cost.

CARBON CAPTURE, UTILIZATION AND STORAGE

Limiting the release of harmful gases into the atmosphere has been a challenge over the years. Unleash modeling capabilities and take them a step further with GT-xCHEM for chemical system modeling of new clean technologies like H₂ internal combustion engines (ICEs), carbon neutral fuels, CO₂ capture, and storage.

PREDICTIVE MAINTENANCE AND DIGITAL TWIN

Industries are transforming to become more operation efficient, safe, and cost effective. GT-SUITE's capability of replicating physical systems as a digital twin with internet of things (IoT) architecture will assist in leveraging the digital data for advanced analytics and data sensing to provide all the information needed for detecting leakages, predictive maintenance, energy consumption, environmental conditions, performance, and preventive breakdowns.

FUEL CELL SYSTEM

In order to move towards net zero emissions, increased attention towards hydrogen combustion and the development of fuel cell systems have grown tremendously. GT-SUITE integrates flow, thermal, chemical, and electrical solutions to enable complete modeling of the balance of plant (BoP) and systems such as air compression and humidification, hydrogen storage and recirculation, cooling systems, power management controls, and more. The flexible range of fidelity provides an ideal simulation environment for system design, component selection, and controls optimization. Advance modeling such as proton-exchange membrane fuel cells (PEMFC), solid oxide fuel cell (SOFC), electrolysis, real-time modeling and in the loop modeling (XiL), co-simulation, flow field discretization, and dedicated templates for fuel cell systems and components are included.

