Virtual pipeline

Setting the operational standard

Algirdas Čebatorius
Managing Director
Baltic Countries
LNG Value Chain

Source: Shell
SSLNG Opportunities Driven by Environmental Mandates

- Remote Power Generation
- Peak Shaving
- Iso-Tank Export
  - Independent Power Generation
- Diesel Replacement Fuels
  - Heavy Duty Trucks – China and US
  - Rail Transportation
  - Mining Operations
  - E&P Operations
- Exploration & Production
  - Fracking
  - Production
  - On-site Power Generation
- Railroads
  - Terminal for Refueling
- Marine
  - Barges / Near Shore Boats / Ferries

TerminalManager Expands to Cover Entire Terminal Business Process

- **Customer Management**
  - Customer Portal
  - Contract Management
  - Expanded Order Types

- **Order Entry and Registration**
  - Customer Registration
  - Purchase Order Entry
  - Load Order Entry
  - Pre-Registration of Driver / Vehicle

- **Planning & Scheduling**
  - Timeslot Definition
  - Slot Booking

- **On Site Preparation**
  - Site Access Procedure
  - Pre-weighing

- **Loading / Unloading**
  - Pre-Authorization
  - Line-up
  - Gantry Batch Control
  - Line-off

- **Post Loading / Unloading**
  - Post Weighing
  - Issue Documents
  - Departure Procedure

- **Billing & Invoicing**
  - Multiple Charge Types
  - Invoice Generation

- **Inventory Management & Reconciliation**
  - Terminal Inventory Management
  - Bulk Movements

**Expanded Business Processes New in TerminalManager**

**Site Order to Cash**
## Emerson Solutions for Terminals Industry

### Enterprise Management
- Network Optimization
- Enterprise: Order to Cash
- Site: Planning, Scheduling
- Site: Order to Cash

### Operations Management
- Operations Management and Operator Performance
- Intra-Terminal Automation
- Tank Inventory Management
- Gantry Automation

### Automation & Control Systems
- Measurement and Final Control

### Intelligent Field Devices & Instrumentation

*For small terminals

### Software Solutions
- TerminalManager
- DeltaV
- AMS
- TankMaster
- TransportPlanner
- Synthesis
- TerminalScheduler
- DeltaV Logbooks

### Measurement and Control
- Level/Pressure/Temperature/Regulator/Flow Measurement Control
- Valves/Actuators
- TankMaster

---

*For small terminals*
Virtual pipeline
The overall solution

Sales and operations

Logistics and execution
Virtual pipeline solution
LIT – Liquid Intelligent Tank

**Concept:**
1. Standard ISO container – easy logistics on standard truck/rail/ship
2. Certified according dangerous goods logistic rules
3. Full data transfer to operations center about process data and position
4. Solution development in partnership with Western Baltic Shipyard (OEM)

**Intelligence**
1. Energy and process monitoring
2. Emission management – monitoring of safety relief valves
3. Data transfer using GSM network – 24/7 visible at operation center
4. Operator/driver interface to be sure that process is safe
Virtual pipeline solution
Intelligent Custody Transfer Skid

Concept:
1. Standard solution mounted into frame - easy logistics
2. Standard connection for 1 or multi tank connection
3. Batch control with energy calculation possibility
4. Highest accuracy custody transfer
5. Efficient energy management using energy in the tank and BOG compressor (potential option)

Intelligence
1. Single automation platform with integrated LIT for supply management
2. Data transfer using GSM network – 24/7 visible at operation center
3. Remote batch control – standardized solution for operations
4. Wireless diagnostics of critical equipment for easy maintenance planning and efficiency monitoring
Virtual pipeline solution  
*iOps – Intelligent operations and logistics center*

**Idea:**
1. Standard solution with integrated operations, planning and order to cash handling
2. Scalable solution from 3-4 tanks and one station to multi tank and multi station
3. Integrated diagnostic solution for maintenance planning

**Solution**
1. Operations handling and planning
2. Process control and inventory tracking with mass balance
3. Logistics and terminal planning
4. Flexible commercial management
TerminalManager Addresses Key Challenges

**Bottlenecked Terminals**
- Due to increased customer and market demands
- Greater product diversity
- Limited operational flexibility
- Complex logistics requirements
- Limited storage

**Increased Turnover**
- Improved ROA due to greater flexibility and higher throughput

**Close the Books Faster**
- with timely and accurate transactional data

**Greater Visibility**
- to activity and inventory

**Greater Connectivity**
- with customer requirements

**Streamline Operations**
- through effective scheduling and automation of manual processes

**Faster product transfer**
**Timely information transfer**
**Improved cash conversion cycle**
Helping Our Customers Address the World’s Most Critical Needs
2016 Emerson At-A-Glance

FOUNDED
1890
HEADQUARTERS IN
ST. LOUIS, MO
USA

WORLDWIDE
74,000
EMPLOYEES
155
MANUFACTURING
LOCATIONS

CORE BUSINESS PLATFORMS
EMERSON AUTOMATION SOLUTIONS
EMERSON COMMERCIAL AND RESIDENTIAL SOLUTIONS

RECOGNITION
#128 AMONG FORTUNE 500
OF AMERICA’S
LARGEST
CORPORATIONS

EMERSON EMPLOYEES
WERE AWARDED MORE THAN
1,800 PATENTS
WORLDWIDE IN 2016

THOMSON REUTERS
TOP 100
GLOBAL INNOVATORS

$14.5 BILLION
IN GLOBAL SALES
FISCAL YEAR 2016*
*Excludes results of discontinued operations, repositioning items and prior year divestiture gains.

60 YEARS
CONSECUTIVE YEARS OF INCREASED DIVIDENDS

NYSE: EMR
Improving Our Process and Industrial Business Customer Performance with Measurable Results

Industries Served include
- Oil and Gas/Refining
- Chemical
- Power
- Pharmaceuticals
- Food and Beverage
- Metals and Mining
- Water and Wastewater
- Life Sciences

Core Expertise
- Industrial Internet of Things
- Systems and Asset Management
- Measurement and Analytical Instrumentation
- Control Valves, Actuators and Regulators
- Industry Services and Solutions

Our Brands include
- Appleton
- ASCO
- Bettis
- Branson
- DeltaV
- Fisher
- Micro Motion
- Ovation
- Plantweb
- Rosemount
Our technology- and engineering-based program is designed to help industrial companies achieve Top Quartile performance and recover more than $1 trillion* in operational losses globally.

Operational Certainty

We combine innovative technology and engineering to improve capital efficiency and boost project schedule reliability—helping to address the billions of dollars lost due to project excesses each year.

Project Certainty

Plantweb digital ecosystem provides a robust portfolio of hardware, software, intelligent devices and services for securely implementing the Industrial Internet of Things, with measurable business performance improvement.

*Emerson internal estimate
Emerson Is Trusted with the Largest, Most Complex Projects in the World

- Petrobras COMPERJ: Largest SA MAC
- MWRD – Chicago: World’s largest WW treatment plant
- BP Whiting: Automation upgrade and expansion at BP’s largest refinery
- Qatargas: World’s largest LNG trains
- Statoil: Platform hot cutover upgrade
- PGE Belchatow: Largest fossil power plant in Europe
- Conoco Phillips Bohai-II: Six platforms and large FPSO
- BASF-YPC: 10-plant chemical complex
- Fujian Refining and Ethylene: China’s largest integrated refining / petrochemical facility
- Huaneng Group: Four 1000MW ultra-supercritical power plants
- Shell (SPEX): Unmanned remote facility
- Shell Prelude FLNG: Largest floating structure built in the world
- Santos ACE: Largest on shore gas plant in Australia
- North West Redwater: First new Canadian refinery in 30 years
- Sasol: World-scale ethane cracker and derivatives complex
- Braskem-Idesa: 1M+ metric ton/yr ethylene plant
- Vale: World’s largest truckless mine
- Petrobras: Platform hot cutover upgrade and expansion at BP’s largest refinery
- Conoco Phillips: Six platforms and large FPSO
- BASF-YPC: 10-plant chemical complex
- Fujian Refining and Ethylene: China’s largest integrated refining / petrochemical facility
- Huaneng Group: Four 1000MW ultra-supercritical power plants
- Shell (SPEX): Unmanned remote facility
- Shell Prelude FLNG: Largest floating structure built in the world
- Santos ACE: Largest on shore gas plant in Australia
Dedicated to Improving the Quality of People’s Lives Around the World

Industries Served include

- Construction
- Commercial Buildings
- Food Retail
- Food Service
- Transportation
- Contractor
- Homeowners

Core Expertise

- Heating and Air Conditioning
- Thermostats
- Refrigeration
- Monitoring Systems and Facility Controls
- Food Waste Disposals
- Home Repair and Maintenance
- Construction and Plumbing Tools

Our Brands include

- Copeland
- InSinkErator
- ProAct
- RIDGID
- Sensi
Our Copeland Scroll modulated compressors can help to reduce energy consumption by one-third or more in air-conditioning units.

Emerson’s top-rated* Sensi Wi-Fi Programmable Thermostat enables our customers to control their environment, with the touch of a button, from anywhere in the world.

Grind2Energy, Emerson’s innovative system to turn food waste into energy, is addressing food waste challenges in the United States.

Our Cold Chain leadership and ProAct service provides technology to continually monitor food, helping safeguard the world’s food supply from farm to fork.

*According to J.D. Power 2016 Smart Thermostat Satisfaction Report