www.space-on.co.kr

S-ON SPACE

NEW TECHNOLOGY VENTURE COMPANY

Intelligent imaging analysis and the process automation technology company

S-ON SPACE

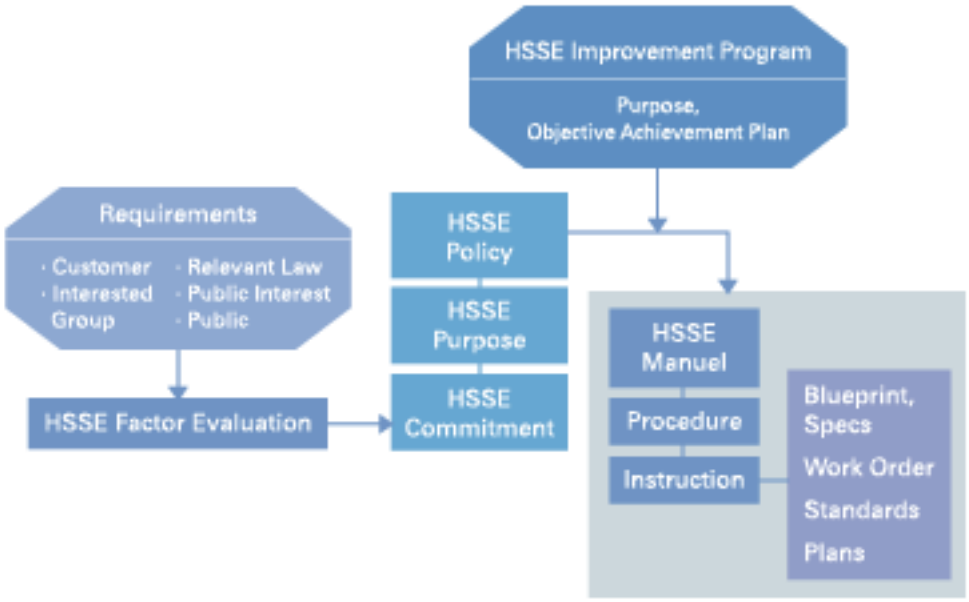
에쓰온(주) S-ON co.,ltd

S-ON

Chemical fluid industry plant automation & smart traffic security system development specialized company based on its IT convergence and integration research development With its IT converged and integrated technology including multi-way valve automatic control, optical technology for process inspection, camera technology, and wireless craft communication, S-On provides total automated solutions customized to individual company's feature and industrial need. S-On has been a leading developer and supplier of the automated control device and system for industrial automation.

HSSE (Health, Safety, Security, Environment)

HSSE Management System Documentation Structure



HSSE Management System Documentation Structure

History

Automated device, plant design, intelligent security CCTV, 3D CCTV Camera Automated process system integrated vessel wired wireless communication device manufacture

2014
- Establishment of IT Converged and Integrated Technology Laboratory
- Hankook Shell Oil Co., Ltd. Pigging Detection Automation System development
- Korea Research Institute of Ships and Ocean Engineering Deep sea equipment control & safety management software/ localized development of equipment and materials
- Dongmyeong Pier Intelligent 3D CCTV Security Surveillance system proposal (Ministry of Land, Transport and Maritime Affair)
- Busan, Daegu, Ulsan City Hall Road traffic sign integrated & intelligent 3D system development proposal
- Ulsan City Library intelligent 3D CCTV Integrated management system development proposal
- Valve digital position monitoring switch development

2013
- Hankook Shell Oil Co., Ltd. Filling/transfer automated system development proposal (patent pending)
- Hankook Shell Oil Co., Ltd. P& ID blueprint design development
- Hankook Shell Oil Co., Ltd. Homogenizer safety auto-control system development
- Hankook Shell Oil Co., Ltd. Flowmeter touch pipeline control system development
- 2013. 04.05 S-On Co., Ltd. Corporation founded
- Hankook Shell Oil Co., Ltd. International pier video security CCTV & optical fiber cable lines construction
- Small & Medium Business Corporation contract development company (electronic control, plant design, automated device)
- New Technology Venture Enterprise Certified (Korea Technology Finance Corporation)
- ISO2008, 14001, OHSAS 18001 Video Analysis & Industrial plant automated processing development and manufacture
- England HSSE (Health, Safety, Security, Environment) Development and manufacture under the regulation of Hankook Shell Oil Co., Ltd.
- Grease manufacture automated system development (APS) Small & Medium Business Corporation
- Digital Lens Adaptor using mirror-less camera and lens (patent pending)
- Kyungsung University Business Incubator Center (KBIC) Entrepreneur-customized business participant company agreement (Small Business Administration)

2012
- Dongeui University IT Convergence Components Research Lab Craft wired/wireless integrated technology consultation (Ministry of Land, Transport and Maritime Affair)
- Ministry of Land, Transport and Maritime Affair National E-navigation video security Sea traffic control system proposal
- Hyundai Heavy Industry Traffic monitoring analysis & traffic control system development (S-On)
- Busan City Hall / KBS Disaster management broadcast & construction safety headquarter disaster system development

2011
- Oman Government video security control system & secure communication device supply (Wadi)
- Malaysia Port AIS+VMS+GIS Integrated operation control system development proposal (TSB)
- Sweden North Sea Baltic Sea Skagen Norway Port Integrated operation control system development proposal (TSB)
- ITS Automatic Traffic Enforcement Equipment standardization project (The Road Traffic Authority)
- Japan SEATEC Electric/electronic vehicle competition (Fog resistant network/ PTZ integrated CCTV)
- Changwon Hyosung Corporation plant design development, POSCO E-smart reader development supply.

2010
- Automatic Identification System (AIS) Class-A Development (Saracom)
- The Blue House RFID Weapon management system & Jammer system development (Saracom)
- KMC Hanhwa Bearing OEE & SPC 8 factories all automated processing (IBM, System Korea)
- Gamwon-do Korean Army 8th Corporation East coast barbed wire fence demolition project infrared/laser/thermal imaging wide-area surveillance system development
- Ulsan NH Agricultural and Marine Products Logistics Center unmanned control system supply (CAPS)

2004
- S-On founded

Technological Know How

Our fundamental policy is to manufacture and develop management system manual for video analysis assessment and industrial plant processing; to regulate the development under the requirements of ISO 9001:2008, 14001: 2004, OHSAS : 18001; and to develop the core technology for automated control service of design analysis, industrial, marine, and chemical plant processing.

Quality Policy

1. Comprehensive client management
2. Continuous improvement
3. Optimal solution arrangement

Management Philosophy

1. Mindset of the new technology venture enterprise
2. Customer satisfaction technology service
3. Family company that returns profit

Environment Policy

1. Eco-friendly product development
2. Continuous improvement of the working environment
3. Environmentally safe management & Environment protector

Venture Enterprise Verification

Technology Venture Enterprise

HSSE

ISO9001/ISO14001

Software

Corporate Research Institute Certificate

Patents

International Patent Pending

- PCT/KR2011/008000
  Craft Celestial Navigation System
- PCT/KR2011/007826
  Anti-fog telescope

Domestic Patent Pending

- 10-2013-0076136
  Flexible Multi-way Integrated Valve, and lube filling, transfer system made with the valve.
- 10-2013-0039438
  Mirror-less Camera and lens Digital adaptor for interface
- 10-2008-0022251
  Real-time Wireless Network Remote Control & Fixed/portable communication device and 5 others
- 10-2014-0102523
  Intelligent 3D CCTV Camera image processing device

Multi-Way Valve Auto Control System

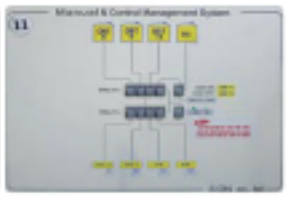
Complete automated fluid processing solution

In most cases Fluid Products(lubricant,beverages) are manufactured in individual, highly-automated processes.
One of the most complex oil processes is that of lubricant. Reliable sensors are required here.
They ensure maximum process reliability so that a high-quality product results without quality fluctuations.
S-ON offers solutions for all areas of the manufacture of Fluid Products, from filling and bottling or mixing of the Fluid Products to packaging and conveying.
A wide range of adapters enables easy and safe integration into the process.

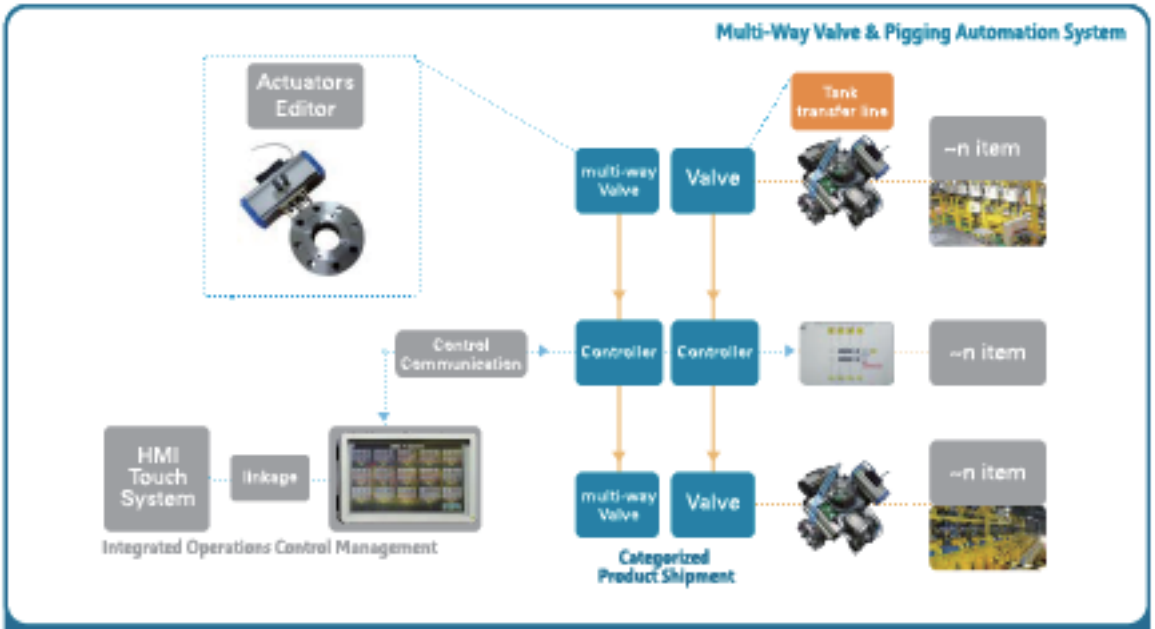
Aucturator Control

Multy-Way Valve

HMI Auto-Control



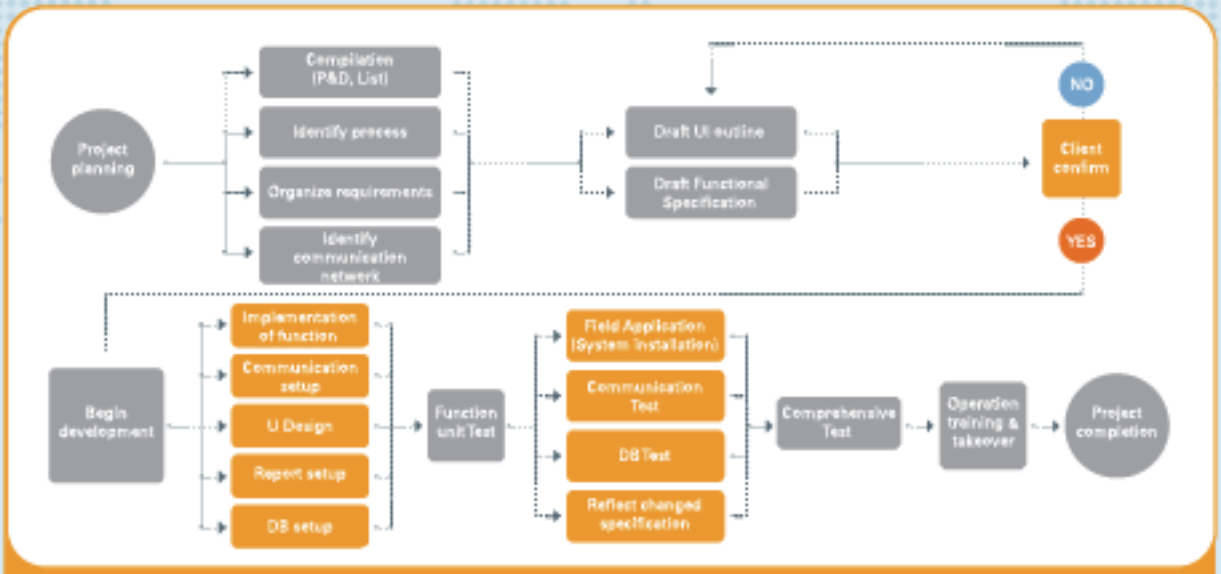
CMS Local Control



Process Flow Diagram

HMI (Human Machine Interface) System

There are numerous data sources in production industry facilities, from the field equipment, to PLC, decentralized control system (DCS). S-ON HMI is the top open system that has been recognized as a product that can connect various plant field equipment with system through integrated process management of image analysis/inspection. Many industrial plants around the world are using S-ON HMI. InTouch can link hundreds of I/O s and OPC servers, and, if necessary, easily create data server specialized with SCADA server toolkit. By using S-ON HMI, you can access all data.



Optimal solution for complete automation

Portable Smart Remore Controll System

Automated manufacture remote video/analysis/ control management system

Real-time video analysis inspection processing remote monitoring & control management

Installation case | Hankook Shell Oil Co., Ltd.

CMS Local Control

Control system for each processing stage

CMS Local Control

Control system for each processing stage

5 or 6-way Valve Auto-Control System

The multi-way valve is instrumental for the plants requires various types of compounds. This product improves manufactural and spatial inefficiency from the standard 2-way or 3-way valve. S-On's multiway valve is appropriate for various processes which involve fluid products manufacture/ transfer/ refill.


Before

- Oil spill contamination whenever hose is installed or removed
- Oil spill caused by pressure from the hose coupling
- Hygienic and organizing issues arise when connecting the hose to corresponding tank line. (The worker needs to enter the oval in order to detangle the hose)
- Unsafe and unhygienic working environment around the hose exchanger because of oil spills
- Inefficient time use because of delay in hose connecting time, cleaning time, and manufacture-wait

Smart HMI System Synchronized

(Automated imaging analysis and remote process auto-control imaging management system)




After

- Supplement the hose exchanger disadvantage by installing Manifold Auto Control System
- Prevents malfunction and improves working/hygienic environment because attachment /detachment of the hose is unnecessary.
- Convenient operation through the operator's manual/automatic GUI touch HMI, with a combination. of 5,6-way valves and 44 tank lines, which enables refill and transfer of 640 different products.

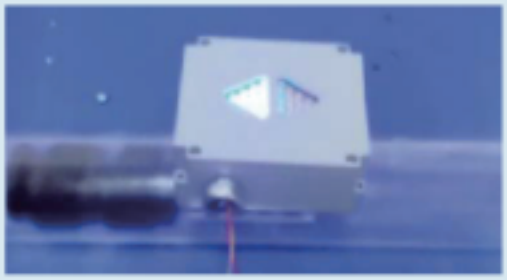
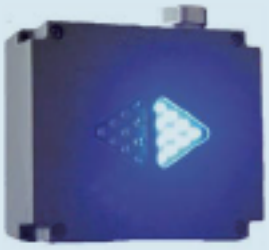
Pigging Detection System

Ultra-Sonic Pigging Detection Automation System

USPD is a non-intrusive ultrasonic pig passage indicator designed for reliable detection of all kinds of pigs used for pigging of filled liquid pipelines. It also provides indication and an estimate of accumulated debris in front of the pig and an estimate of the effectiveness of the pigging procedure. The device is certified as intrinsically safe for use in hazardous areas.







Magnetic & Sonic Pigging Detection Automation System
Our detector work on the principal of detecting a change in magnetic field as the pig passes beneath the sensor. Therefore, the pigs must be fitted with a magnetic activation package.
We can supply suitable magnetic activation packages for simple installation to an existing pig.
We can supply complete signalling systems that would include Pig Signallers together with purpose built pigs that would be fitted with magnetic activation packages.

Pigging automatic control HMI System

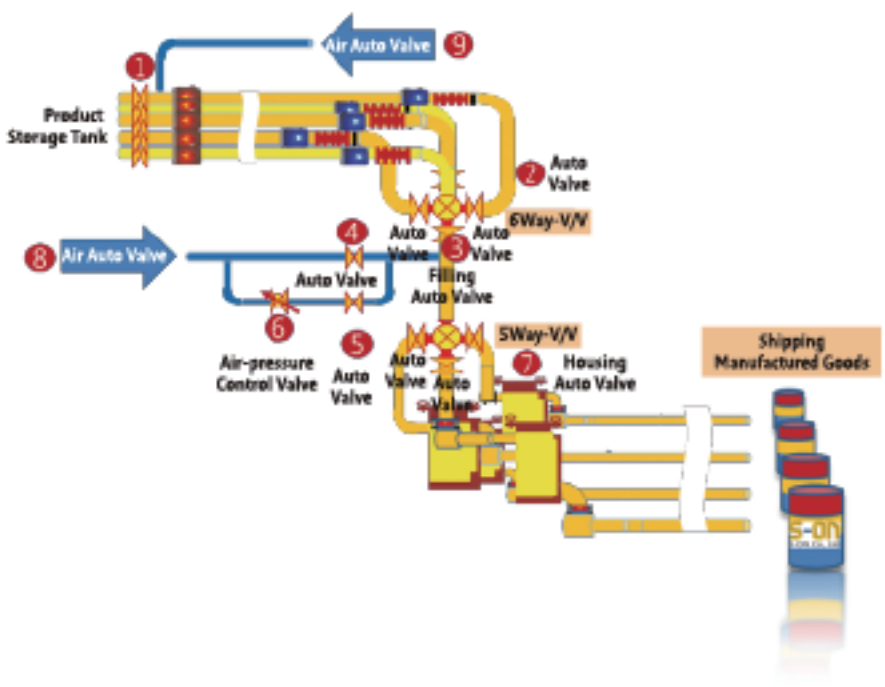
2" ~ Magnetic Type
8" ~ Ultrta-Sonic Type
PIG' s Detection : 0.1~20m/s
Operating Temp. : -30 to 70

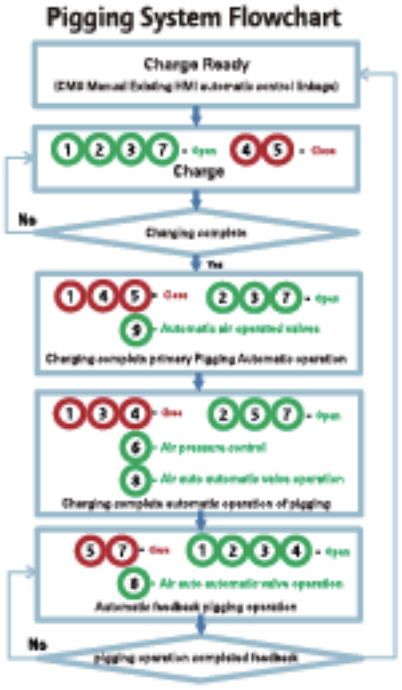
Pigging System Configuration

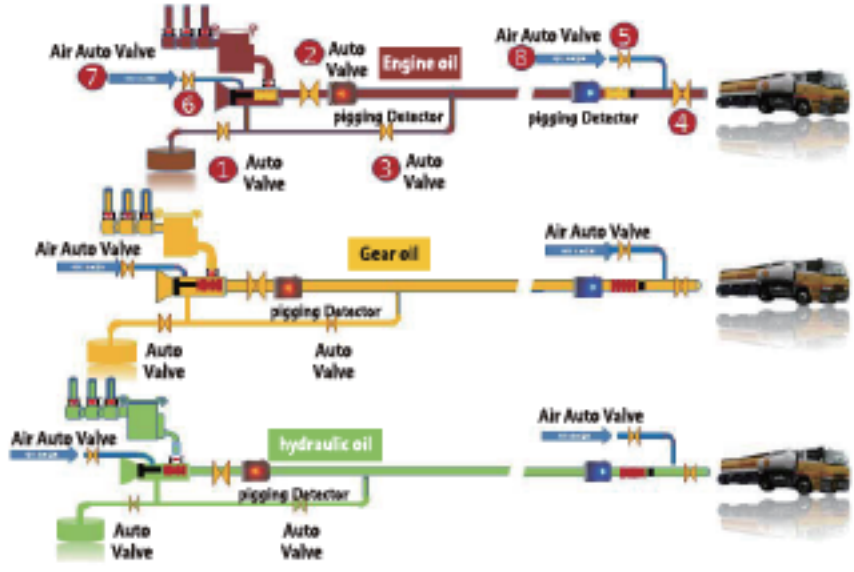
Pigging automatic control HMI System

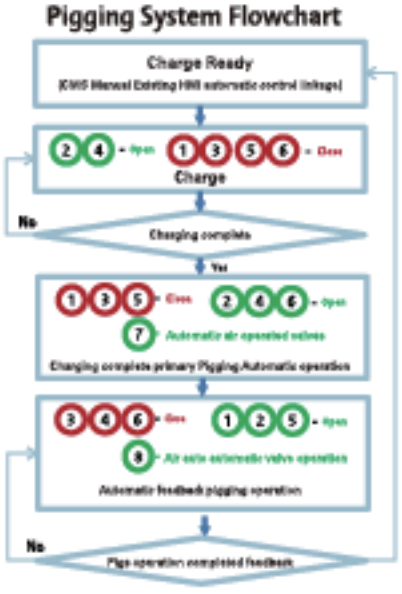
Auto-Control Pigging System

Pigging is technology for recovering trapped product in process pipelines after transfers. Pigging works by propelling a device with wiping discs (the Pig) through the pipeline from the source to the destination. As the pig travels through the pipeline, it pushes out the trapped product and cleans the pipe walls leaving the pipeline ready for the next product transfer. Pigging systems help companies be more competitive, reach continuous improvement goals, and be better stewards of the environment.









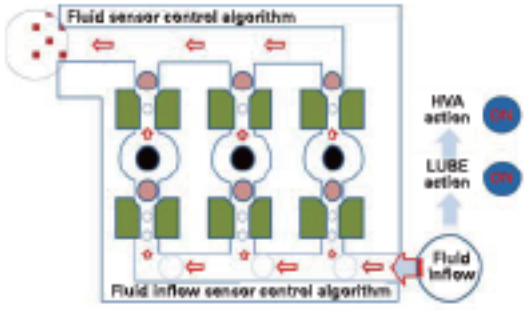
Homogenizer Safety, Automation Solution

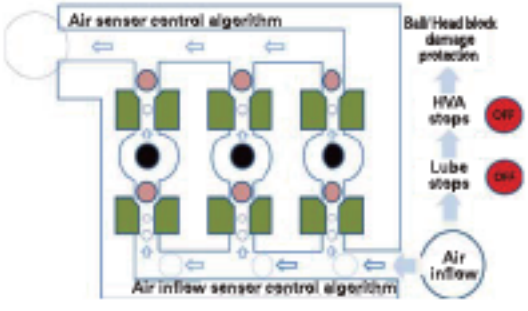
A control solution system that protects automated process facility; extends lifespan of the homogenizer; auto-controls the safely system; and prevents safety accidents by maintaining optimized productivity and manufacture environment, through supplementing disadvantage of the manual stop during operation and preventing possible damage to "ball or head block" from the pressure.

Homogenisation is an important process in the fluid products(grease ,beverages)- processing and fat-processing industries. During homogenisation the fat globules in the grease are reduced considerably by high pressure. This ensures that the creaming of the grease is prevented.

Homogenize

- Other setting or manipulation is unnecessary when using auto-control function.
- Fluid, pressures, and air flow from high pressure of the Crank axis are auto-controlled by the integrated algorithm.
- Air inflow is automatically detected and controlled.
- LUBE and HVA actions are auto-controlled.
- Auto-control is available for homogenizing of various products.
- User-friendly GUI with touchscreen method is provided.
- Application case: Hankook Shell Oil Co., Ltd. Grease manufacture process currently installed and operated





Traffic Safety Smart System

Developed based on T-GIS designing experience, S-On Co., Ltd.'s exclusive road traffic safely solution comprises devices such as Smart Safety Signal and Regional Controller, and monitoring system that operates and manages such devices.

Wireless Smart Safety Signal

The optimal road traffic safety facility for the driver and pedestrian

- Battery rechargeable with solar energy
- Maximized energy efficiency with LED
- Real-time management controlled by regional controller through RF network
- Detachable structure of the product allows prompt installation, maintenance, and management.
- The product does not affect road traffic as it is embedded in ground 5mm or less from the surface.

Installation procedure

Disassembly procedure

Regional Controller

Road traffic safety affirmed through various sensor information and management of road traffic safety facility such as wireless smart safety signal

- Manages road traffic safety facility
- Detection of pedestrians on crosswalk & school zone (Detectable distance 15m, Detectable range 12m x 12m)
- Danger signal indicated through a speeding sensor (Detectable distance about 915m)
- Traffic signal system synchronized with signal detecting sensor
- Real-time information provided though the web-monitoring system and WCDMA network

Web-monitoring System

A real-time monitoring system with GIS concept

- The facility status checkup/The facility management/ Statistics function
- Road traffic safety facility location provided
- Real-time road traffic safety facility status and management information provided
- Statistical function on the regional, facility-categorized condition provided
- Real-time management customized for different weather conditions such as fog and rainstorm, or the night time.

Installation Policy Manual

Road safety facility installation management manual, Lightings chapter [5.3 Lightings of Crosswalk]
Additional installation of supplementary safety facilities is recommended, such as a safety signal, in order to improve safety of a crosswalk.

T3S Applicable Field

Optimized applicability for improvement of the road traffic safety environment

Crosswalk

School Zone

Reversible Lane

Bus Lane

Fog Danger Area

Intersection Danger Area

Outdoor Lighting

Bike Lane

Result of Expected Effect Analysis

Domestic and international research of T3S and similar protects has confirmed the major influence on traffic environment improvement.

- Significantly raised driver's awareness of pedestrian
- Significantly affected the pedestrian's awareness as well
- Analysis of driver's yield for pedestrian shows that the yielding driver has increased in 114%~464%
- Reduction in maximum point speed and minimum point speed is found in all area
- The case in which the drivers yield to the pedestrians have increased 158% in the day time, and as much as 840% in the night time.
- Maximum speed has decreased in 17%, and the average speed has decreased in 26%

Research References

- Analysis of the Intelligent Crosswalk Safety Light (ICSL) effect / Sun-Bok Park
- In-Pavement Pedestrian Flasher Evaluation / Cedar Rapids, Iowa
- In-Pavement Pedestrian Flasher Evaluation / Cedar Rapids, Iowa
- The Effects on Safety of In-Roadway Warning Lights at Crosswalks

Intelligent 3D CCTV

What is the Analytical 3D CCTV?

By extracting 3D imaging from two distinguished cameras than a standard CCTV, it collects analyzable data compensated with possible optical differential error; and provides an interactive SDK with measurable location, length, size, and direction through stereo image matching and Pan/tilt enabled control.

Advantages of Analytical 3D CCTV

- Pan(Horizontal) /Tilt (Vertical) function
- Automatic lateral alignment
- Actual coordinates measurement (3D depth Map)
- Target object's location, size, displacement (direction, speed) extraction
- Various use of 3D data

Analytical 3D CCTV Characteristic

3D Depth Map

- Random region for search (Search Window), Depth region (Search Length), Size of the window to convert Use (Census Transform Window) to extract
- Calculate the total Heming Distance to extract 3D differential space.
- Automated process of above procedures creates the real-time 3D Depth Map

Background, Flat Surface Extraction

Provides background and flat surface searching technology to process the Region of Interest, and to minimize arithmetic process of the background and flat surface.

Measure

Extracted Depth Map and converted coordinates enables measurement of actual or similar distance and height

Moving Object Tracking

Using the 3D data, it tracks specific location or target movement and minimizes the number of cases for estimated movement path

Analytical 3D CCTV Components

HW: 3D CCTV

- Stereo camera mounted
- Pan /Tilt (vertical & horizontal) Control

SW : Image production & analysis function

- Real-time Epipolar Image creation
- Depth map creation
- Measurement function
- Object tracking function

Interactive SDK

- Object tracking function
- Conditional search through Background, Flat Surface function

Analytical 3D CCTV Configuration

Current Device Development Technology		Analytical 3D CCTV
2D Digital video data	Saved data →	2D Digital video data x 2
Color change detection	Saved data →	Coordinates change detection
Video storage, monitoring	Main purpose →	Video storage, monitoring, analysis function
Video data	Extractable data →	Video data + object coordinate
Detection method setup	Automated method →	Object type setup
Detection method setup	Analysis available →	Object-type customized analysis available.
Real-time monitoring	Analysis available →	Real-time monitoring + post-analysis
Workforce	Target object for analysis →	Computer

Analytical 3D CCTV Applications

Field of Movement recognition Robot control

- User Interface
- Interactive Game
- Robot Autonomous Driving
- Disability Robot
- Augmented Reality

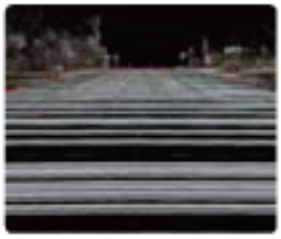
Field of GIS / LBS

- Road surface detection modeling
- Assistant guidance service utilizing 3D data
- Automatic survey of the moving object detectable road facility map
- User's location-based spatial information service using 3rd dimensional coordinate

Field of Monitoring

- Integrated Relation System
- Facility Management System

Analytical 3D CCTV Expected Effect



- Smart Transparent Search
- Connection to the Big Data
- Provides interactive SDK through stereo matching and Pan /Tilt function

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