



VISY

THE SMART SPREADER FOR OPERATIONAL GAINS



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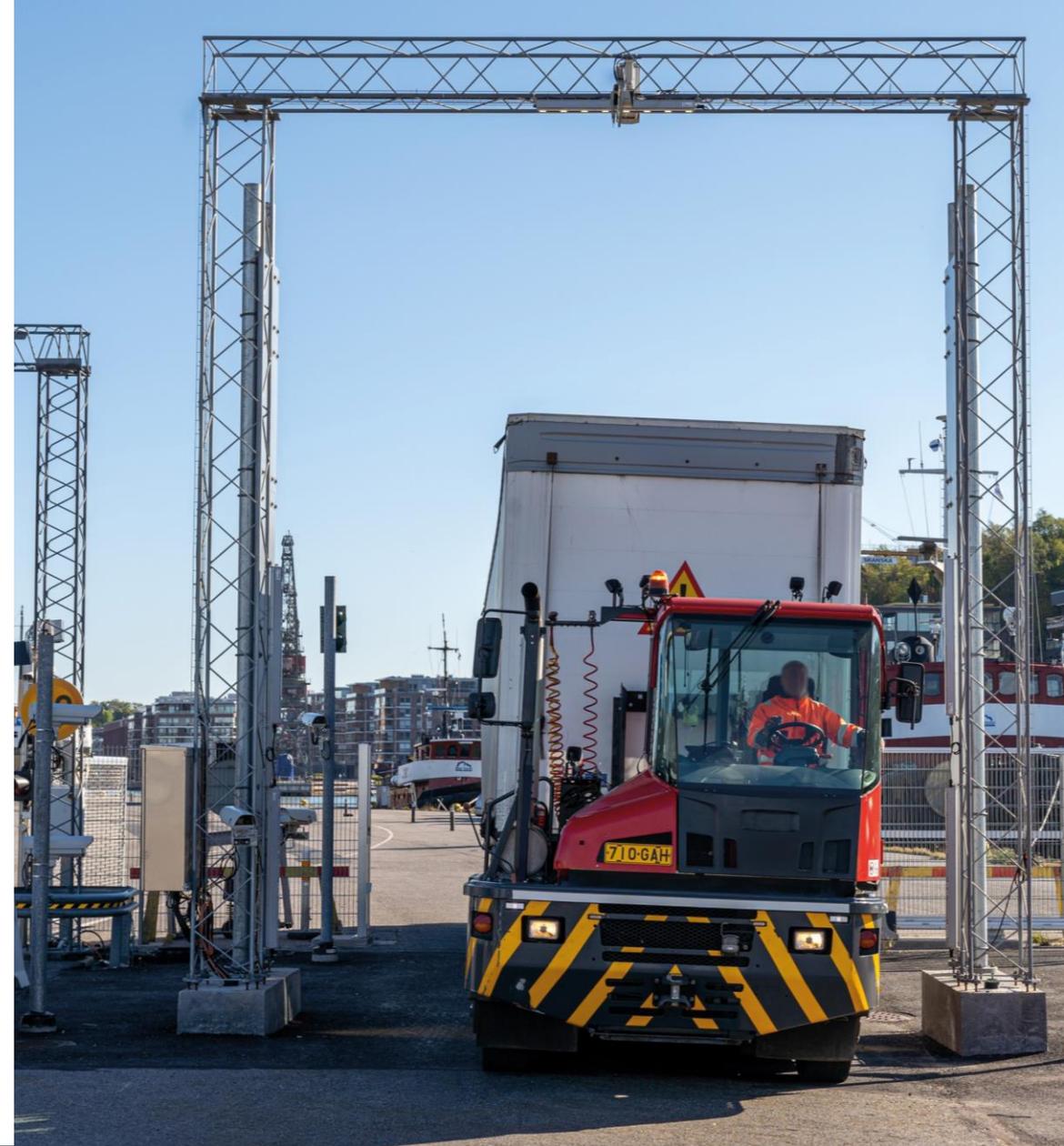
AUTOMATED ACCESS AND AREA CONTROL

28 March 2023

Expand | your vision

Overview

- ✓ Visy at a Glance
- ✓ Process Automation
- ✓ Vision Technology & Data Collection
- ✓ Spreader OCR and Lift Ops
- ✓ Automatic Damage Detection System
- ✓ Closing Thoughts





Save time & money, improve health & safety with technology

A pioneer in optical character recognition (OCR), applied AI, and deep learning for camera-based automation solutions

Process automation solutions that are designed to streamline every part of a terminal for mission-critical operations

Market leader in vision technology innovation: TopView (spreader OCR), automatic damage detection, AREA

About Visy

- ✓ Innovating since **1994**
- ✓ **500+** sites automated
- ✓ **5,000,000+** access control decisions daily
- ✓ **Billions** of OCR events
- ✓ Operating in **25+** countries

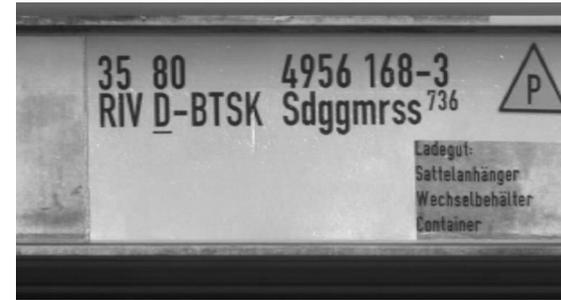
Process Automation?

Collect, Digitize and Share Data

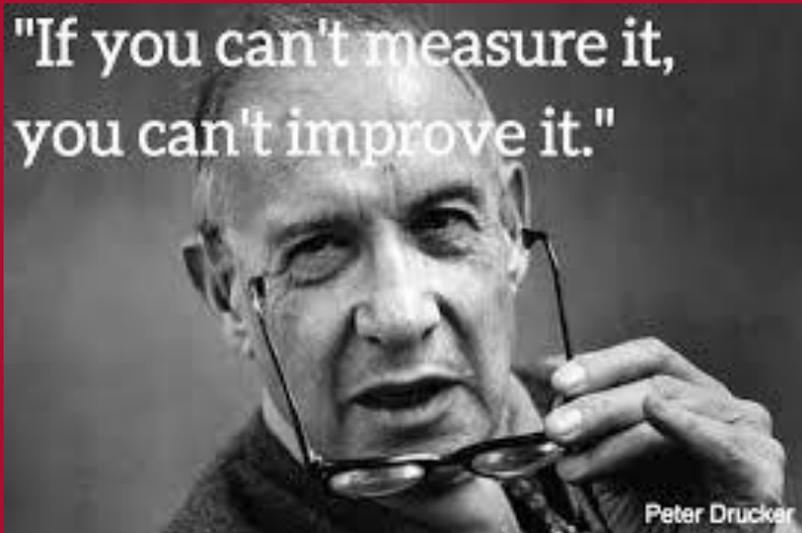
- ✓ OCR & RFID data (Cargo, Asset, Driver, etc.)
- ✓ Single-platform OS for Gate / Rail / Quay / Yard
- ✓ Verify the “Who, What, When, Where, Why & How” of operations with 3rd party systems (i.e., TOS & PDS)

Outcome Focus

- ✓ Scalable, repeatable, predictable, profitable traffic and cargo flow operations
- ✓ Improve key performance indicators (KPI's)
- ✓ Specific ways to measure



"If you can't measure it,
you can't improve it."



Peter Drucker

Higher
productivity &
accuracy in all
transactions

Decrease Cost
per Lift by up to

66%

Increase STS Gross
Moves per Hour by up
to

60%

Decrease Truck
Turnaround Time
by up to

60%

Automating gate
operations saves
costs up to

80%

(Better support for labor,
increase throughput
capacity)

"With the help of Visy Crane
OCR in April 2020, QQCTN
made a new world record by
**handling 44.6 containers /
hour** with a single crane."
- Victor Zhang, Effi-Go Tech Ltd.



QQCTN

Vision Technology Challenges are Real...

What's so difficult about vision technology?



Puppy or Bagel?



Labradoodle or Fried Chicken?

Art Credit: Karen Zack

State of Vision Technology

What's so difficult about vision technology?



Doughnut or Mushroom?

State of Vision Technology

What's so difficult about vision technology?



Battleship or Rock Formation?

State of Vision Technology

What's so difficult about vision technology?



Tree Branches or Loch Ness Monster?

State of Vision Technology

New Standards

- ✓ In the area of facial recognition, the developments are incredible
- ✓ Machines are more accurate and faster than humans – beyond “human level”

What happens when we apply this technology to terminal operations?

Facial Recognition Method	Year	Accuracy
DeepFace (Facebook)	2014	97.35 %
FaceNet (Google)	2015	99.63 %
ArcFace (Imperial College)	2018	99.83 %
Human		97.53 %

Data Collection

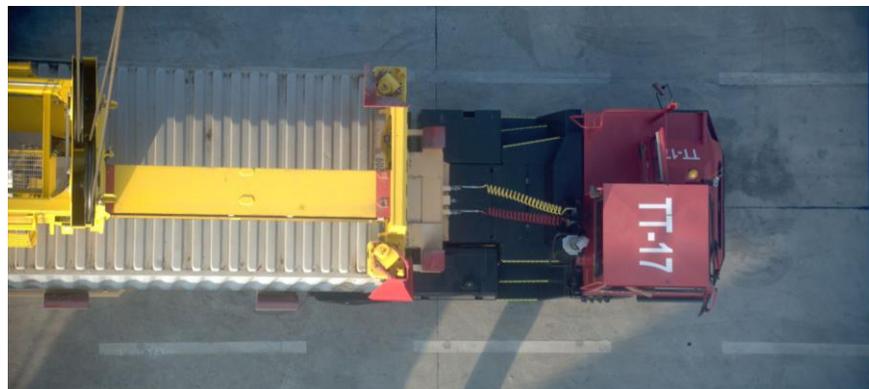
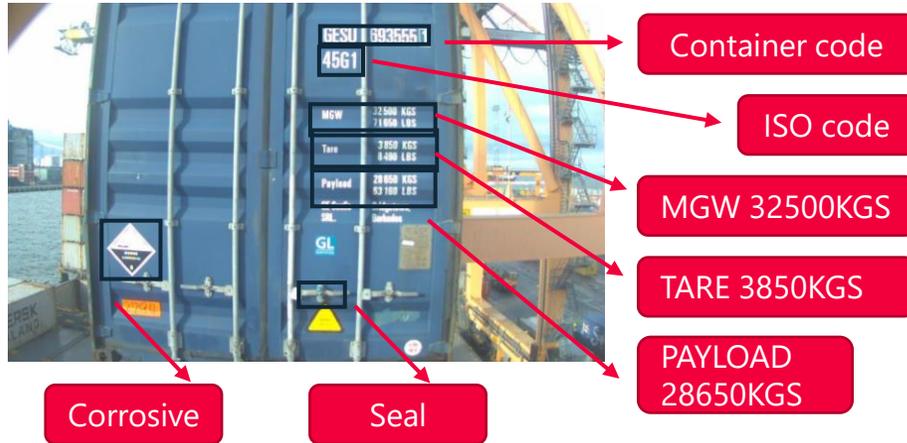
Visy Deep Neural Network (DNN)

- ✓ Automation depends on digitalizing accurate data
- ✓ Vision technology from Deep Learning – Artificial Intelligence (AI)
- ✓ Visy DNN analyzes images and shares data faster and more accurately than a human
- ✓ Sample pics are raw OCR reads from Visy systems; the DNN correctly reads damaged box ID's



Data Collection

If the system can see it, the system can identify it



Data Collection

If the system can see it, the system can identify it

Count the # of axles

Locate containers & corners

Detect the presence & type of seal

Detect and classify IMO labels

Tare weight and other visible info

Spreader OCR (Visy TopView)

Automatic Damage Detection

Door orientation

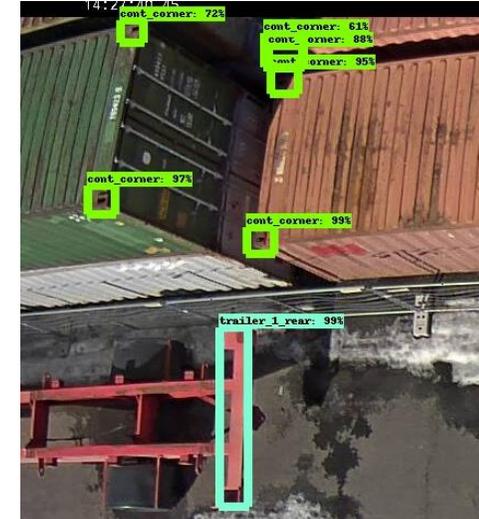
Dangerous goods

Uses CCTV and tablets

Asset tracking (Visy AREA)

Location on Chassis

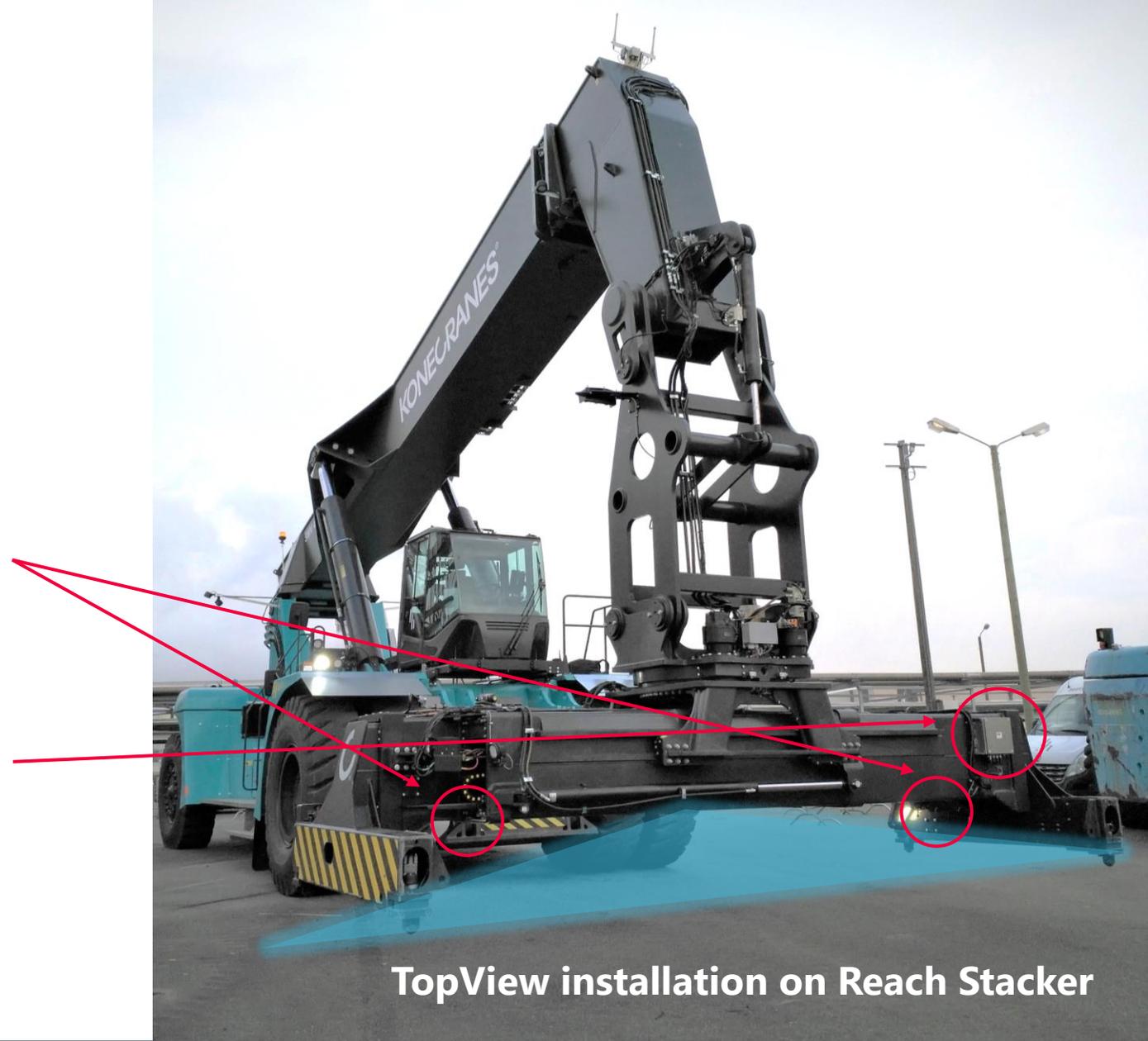
Twin-20 detection



Visy TopView

The Spreader: Common Denominator

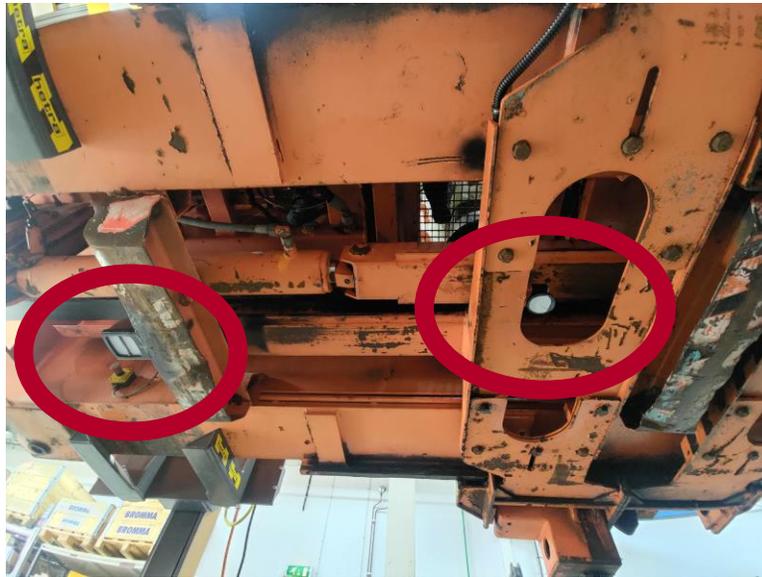
- ✓ Installations to any type of CHE and spreader (single, tandem, twin, and quad spreaders)
- ✓ Cameras are attached to both ends and in the middle of the spreader
- ✓ Recognition PC in cab or in E-room (E-house in STS crane installation)
- ✓ Device cabinet installed directly on the spreader



TopView installation on Reach Stacker

Visy TopView

The Spreader: Common Denominator

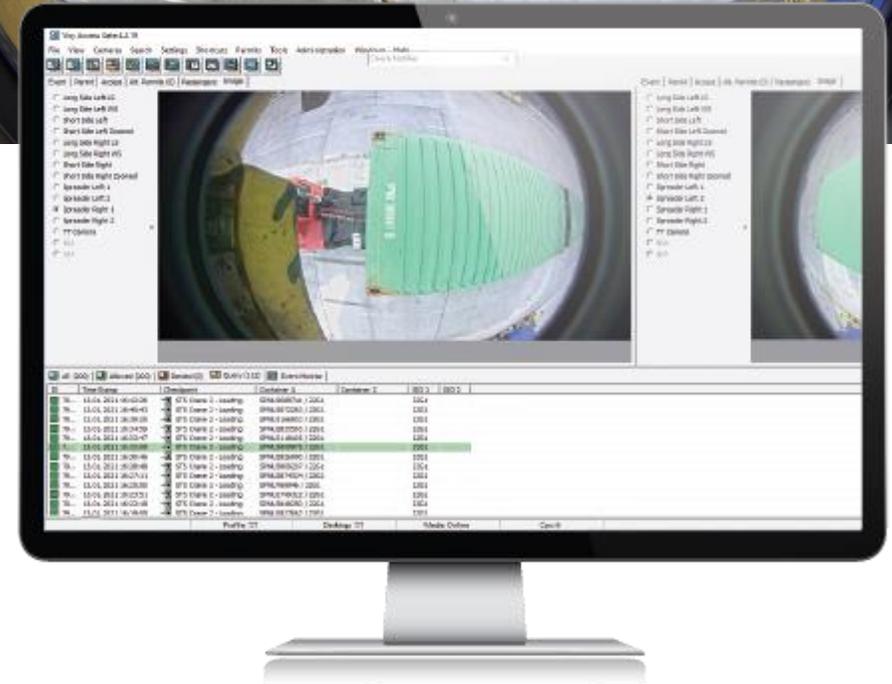


STS installation

Visy TopView

Improve KPI's on all CHE

- ✓ Visy TopView transform spreaders into a smart device with OCR technology
- ✓ Recognition of container IDs from the roof of containers
- ✓ Early alert for wrong lift
- ✓ Automatic twin-20 detection
- ✓ Data exchange and interfacing with third-party systems (TOS, PDS, CCS, PLC)
- ✓ Any move, any location



Visy TopView

Multi-purpose Images

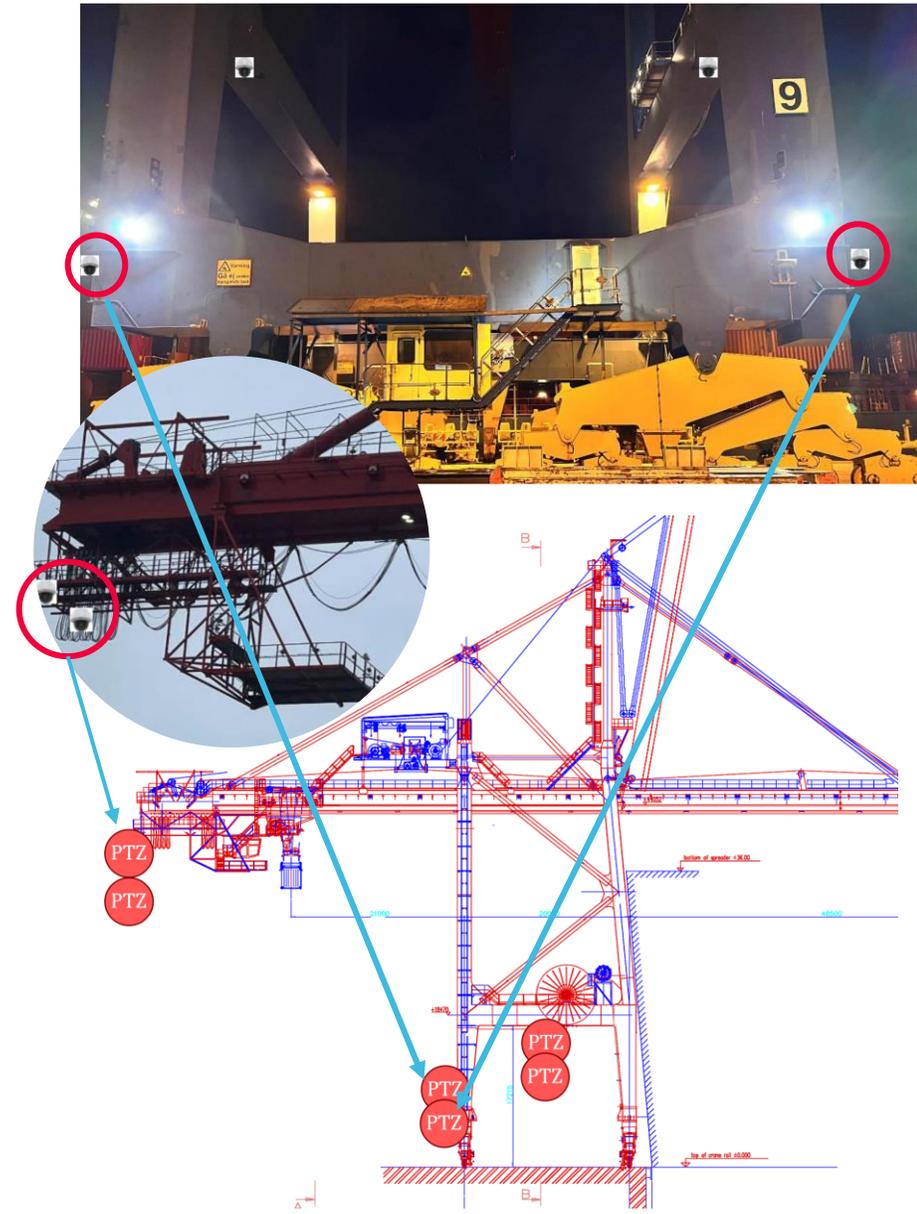


Images of roof for box ID, damage inspection, TTD

Visy TopView

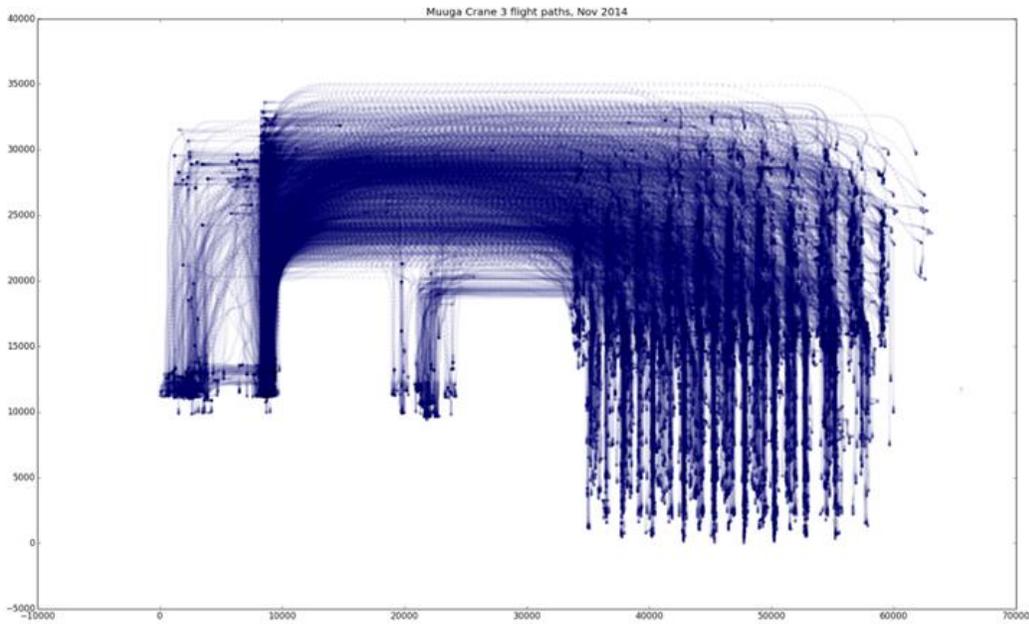
Support STS Ops

- ✓ LaneView PTZ cameras covers all work areas
- ✓ General approach:
 - TopView for spreader
 - LaneView PTZ for other data capture
- ✓ Together, 5-side imaging like GOS
- ✓ Automate all processes, including shuffling in the lanes
- ✓ Terminal tractor ID for workorder



Visy TopView

Data capture for stack integrity



The screenshot displays the Visy software interface. On the left, a 3D simulation shows a container yard with green containers stacked in rows. On the right, a data table is visible, listing container details.

ID	Name	Area Code	Contnr
1	C-blue	C	727
2	D-blue	D	671
3	E-blue	E	826
4	F-blue	F	784
5	G-blue	G	837
6	H-blue	H	186
7	I-blue	I	44

Container	Stack code	Slot code	Slot occupation	Slot length	Co
CHL4863290	020C	020C0910A	EIE		
TON4695206	069C	069C1112B	EIE		
MOL4272730	064C	064C11A	EIE		
TCL4000037	064C	064C13A	EIE		
FSOU4340501	017C	017C0304A	EIE		
MKLU7260004	064C	064C13B	EIE		
CHL4931890	021C	021C0304B	EIE		
KXFL1576880	012C	012C1112A	EIE		
CHL48747602	069C	069C1112A	EIE		
KXFL1883410	012C	012C1112B	EIE		
MOL4012953	020C	020C0102A	EIE		

EventNumber	Date	Identification	ISCode	Yard	Bit

Automatic Damage Detection System (ADDS)

Improve KPIs



- ✓ Visy ADDS automatically recognizes damaged containers and creates alerts
- ✓ AI-based OCR and vision technology improve KPIs and provide a real-time tool for detecting damaged containers
- ✓ Multiple damage classes: dents, bulges, extreme rust, holes, heavy structural damage
- ✓ Proactive approach to damage detection; Faster and more accurate than humans
- ✓ *Digitize damage to automate ops*

What Does This Mean to Ops?

What are the implications of these boxes going into the stacks, to the vessel or on the road?



ADDS for Ops

If the system can see it, the system can identify it

The screenshot displays the 'Visy Crane Gate 4.13.0 (Petri Sarpola/VISY)' application. It features a menu bar (File, View, Cameras, Search, Settings, Shortcuts, Tools, Administration, Windows, Help) and a toolbar with various icons. Below the toolbar are two tabs: 'Event' and 'Landside'. The main area contains two side-by-side camera feeds of a container yard. Red circles in both feeds highlight specific containers. Below the camera feeds is a toolbar with filters: 'All (200)', 'Allowed (200)', 'Denied (0)', 'Query (84)', and 'Event Monitor'. A data table is displayed below the filters, showing a list of container events with columns for ID, Time S..., Date, Time, Checkpoint, Damage Score, Container 2, ISO 1, ISO 2, Bundl..., Comment, Dam..., Orien..., Orien..., and Move....

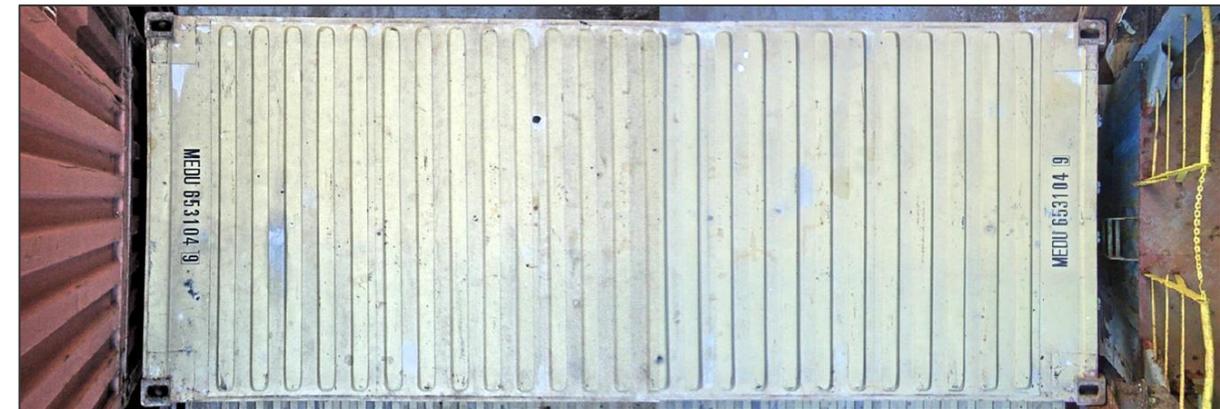
ID	Time S...	Date	Time	Checkpoint	Damage Score	Container 2	ISO 1	ISO 2	Bundl...	Comment	Dam...	Orien...	Orien...	Move...
476633	16.03...	16.03.2023	12:32:57	K11 - ZPMC	0		45G1					Normal		Disc...
476630	16.03...	16.03.2023	12:31:17	K11 - ZPMC	75		45G1				Yes	Normal		Disc...
476627	16.03...	16.03.2023	12:28:42	K11 - ZPMC	73		42G1				Yes	Normal		Disc...
476624	16.03...	16.03.2023	12:26:50	K11 - ZPMC	92		45G1				Yes	Normal		Disc...
476619	16.03...	16.03.2023	12:24:07	K11 - ZPMC	70		45G1				Yes	Normal		Load
476616	16.03...	16.03.2023	12:22:03	K11 - ZPMC	70		45G1				Yes	Normal		Load
476611	16.03...	16.03.2023	12:18:22	K11 - ZPMC	66		45G1				Yes	Normal		Load
476608	16.03...	16.03.2023	12:16:46	K11 - ZPMC	68		42G1				Yes	Normal		Load
476604	16.03...	16.03.2023	12:15:03	K11 - ZPMC	93		45G1				Yes	Normal		Load
476589	16.03...	16.03.2023	12:08:37	K11 - ZPMC	0		45G1					Normal		Load
476574	16.03...	16.03.2023	12:02:09	K11 - ZPMC	92		45G1				Yes	Normal		Load
476569	16.03...	16.03.2023	11:59:44	K11 - ZPMC	81		42G1				Yes	Normal		Load
476559	16.03...	16.03.2023	11:55:22	K11 - ZPMC	0									Load
Start	6553	16.03...	11:53:20	K11 - ZPMC	58		45G1				Yes	Normal		Load

ADDS for Ops

Improve efficiency

- ✓ Twin lift = 8 visible sides
- ✓ 10,000 boxes = 80,000 images to review – what resources are required to do this?
- ✓ With ADDS, only the images with damage need to be reviewed
- ✓ From 80,000 images \approx 1,000 will have damage that require review
- ✓ Reduced workload by 99%
- ✓ Outcome: it's possible to perform damage detection in live operations with minimal effort

ID	Date	Time	Checkpoint	Container 1	Container 2	ISO 1	ISO 2	Dam...	Dam...	Bund...	Comment	Orienta...	Orien...	Move Kind
480554	18.03.2023	11:19:35	K11-ZPMC	TBMJ2917150 / 22G1	MSJA1212463 ...	22G1	22G1	Yes	64			Normal	Normal	Discharge
480551	18.03.2023	11:18:16	K11-ZPMC	PCJA4254507 / 22G1	APDU3863914 ...	22G1	22G1	Yes	49			Normal	Normal	Discharge
480549	18.03.2023	11:16:47	K11-ZPMC	TDJA0789009 / 42G1		42G1		Yes	64			Normal	Normal	Discharge
480548	18.03.2023	11:15:32	K11-ZPMC	APJA4913223 / 42G1		42G1		Yes	77			Normal	Normal	Discharge
480545	18.03.2023	11:13:59	K11-ZPMC	TRJA9460262 / 42G1		42G1		Yes	76			Normal	Normal	Discharge
480543	18.03.2023	11:12:53	K11-ZPMC	ECJA4476986 / 42G1		42G1		Yes	85			Normal	Normal	Discharge
480541	18.03.2023	11:11:40	K11-ZPMC	APJA4288804 / 42G1		42G1		Yes	71			Normal	Normal	Discharge
480540	18.03.2023	11:10:27	K11-ZPMC	APJA4759669 / 42G1		42G1		Yes	0			Normal	Normal	Discharge
480538	18.03.2023	11:09:13	K11-ZPMC	MAGJ4889159 / 42...		42G1		Yes	57			Normal	Normal	Discharge
480535	18.03.2023	11:08:01	K11-ZPMC	APJA4703654 / 42G1		42G1		Yes	60			Normal	Normal	Discharge
480533	18.03.2023	11:06:29	K11-ZPMC	CMJA1719967 / 42...		42G1		Yes	69			Normal	Normal	Discharge
480531	18.03.2023	11:04:53	K11-ZPMC	TCLJA189626 / 42G1		42G1		Yes	75			Normal	Normal	Discharge
480525	18.03.2023	10:59:19	K11-ZPMC	APJA4797967 / 42G1		42G1		Yes	0			Normal	Normal	Discharge
480862	18.03.2023	15:07:48	K11-ZPMC	TCJA4034302 / 45G1		45G1		Yes	69			Normal	Normal	Load
480858	18.03.2023	15:02:02	K11-ZPMC	CMJA1766594 / 22...		22G1		Yes	0			Normal	Normal	Load
480815	18.03.2023	14:58:37	K11-ZPMC	GLJA1396493 / 22G1	CHAU1117906...	22G1	22G1	Yes	61			Normal	Normal	Load
480810	18.03.2023	14:53:24	K11-ZPMC	CMJA1824166 / 42...		42G1		Yes	66			Normal	Normal	Load
480847	18.03.2023	14:51:36	K11-ZPMC	CMJA4735214 / 45...		45G1		Yes	0			Normal	Normal	Load
480843	18.03.2023	14:49:12	K11-ZPMC	CMJA1844376 / 42...		42G1		Yes	61			Normal	Normal	Load
480839	18.03.2023	14:46:29	K11-ZPMC	GACJA6949193 / 45...		45G1		Yes	0			Normal	Normal	Load
480834	18.03.2023	14:43:26	K11-ZPMC	RFCJA206626 / 22K2		22K2		Yes	0			Reversed	Normal	Load
480829	18.03.2023	14:40:06	K11-ZPMC	TCLJA9211980 / 22K2		22K2		Yes	0			Normal	Normal	Load
480824	18.03.2023	14:35:54	K11-ZPMC	DFJA6676997 / 22K2		22K2		Yes	67			Normal	Normal	Load
480819	18.03.2023	14:33:28	K11-ZPMC	SHCJA4640950 / 22T6		22T6		Yes				Normal	Normal	Load



ADDS for Ops

If the system can see it, the system can identify it

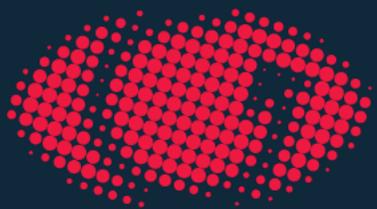
08.06.2022 08:26:12





Closing Thoughts

- ✓ The spreader is the common denominator in Ops
- ✓ Modern AI offers new opportunities
- ✓ TopView turns every spreader into a smart device
- ✓ Collect, digitize, share => automate
- ✓ KPIs: With automation we see a ripple effect of improvements in Ops



VISY

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