

VISY

TOC

EUROPE

E90

THE DIGITALIZATION OF DAMAGE DETECTION

John Lund

Sales & Marketing Director



GATE AUTOMATION AND OCR SOLUTIONS

Expand | your vision



Contents

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- ✓ The Power of Imagination
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Visy at a Glance

Clear purpose and goals

- ✓ Pioneer in optical character recognition (OCR), applied artificial intelligence (AI), and deep learning for camera-based automation solutions including automatic damage detection systems (ADDS)
- ✓ Process automation solutions that streamline every part of terminal operations for mission-critical services
- ✓ Reputable, global supplier of innovative and flexible solutions for container terminals

Innovating since
1994

1 billion+

OCR Images in library

5,000,000+
Access control events
globally each day



Add Value to Ops

Clear purpose and goals

Collect, Digitize and Share Data

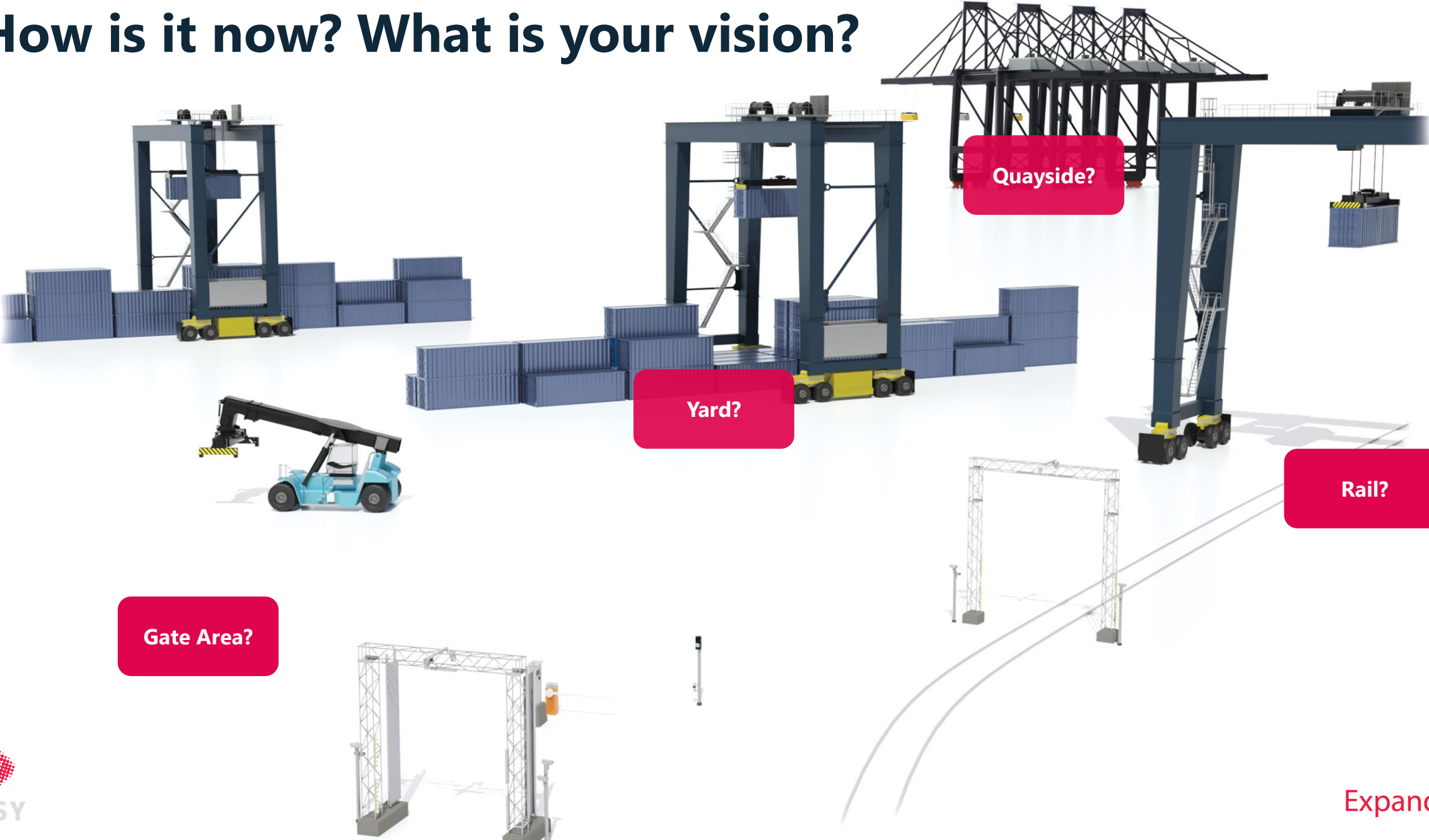
- ✓ OCR & RFID data (Cargo, Asset, Driver, etc.)
- ✓ Single-platform OS for Gate / Rail / Quay / Yard
- ✓ Verify the “Who, What, When, Where, Why & How” of operations with 3rd party systems (i.e., TOS)

Outcome Focus

1. Scalable, repeatable, predictable, profitable operations
2. Improve key performance indicators (KPI's)
3. Technology to provide world-class services



How is it now? What is your vision?



Quayside?

Yard?

Rail?

Gate Area?

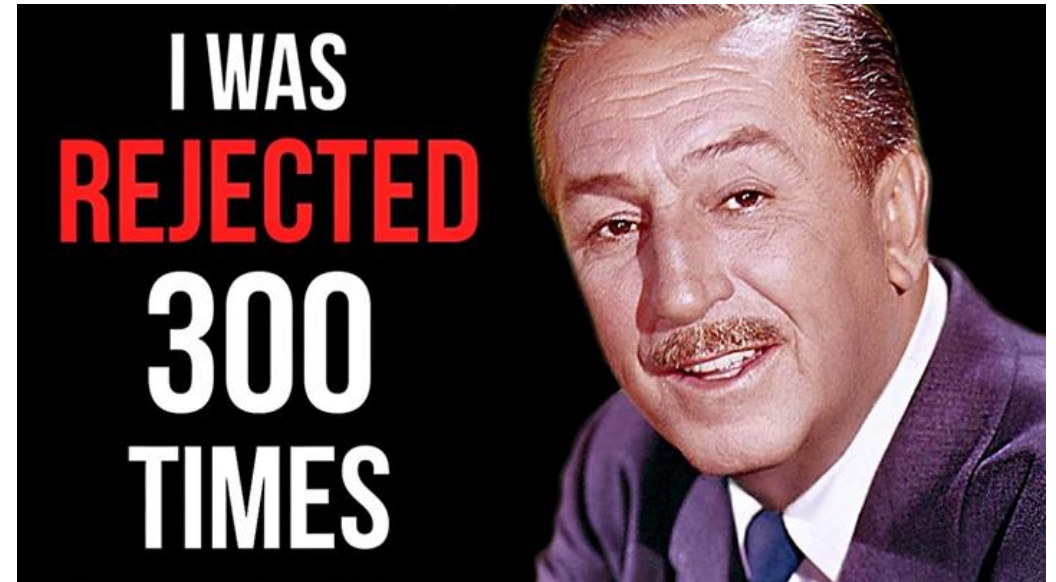
The Power of Imagination

Embrace your vision

"Disneyland (*your container terminal*) will never be completed. It will continue to grow as long as there is imagination left in the world."

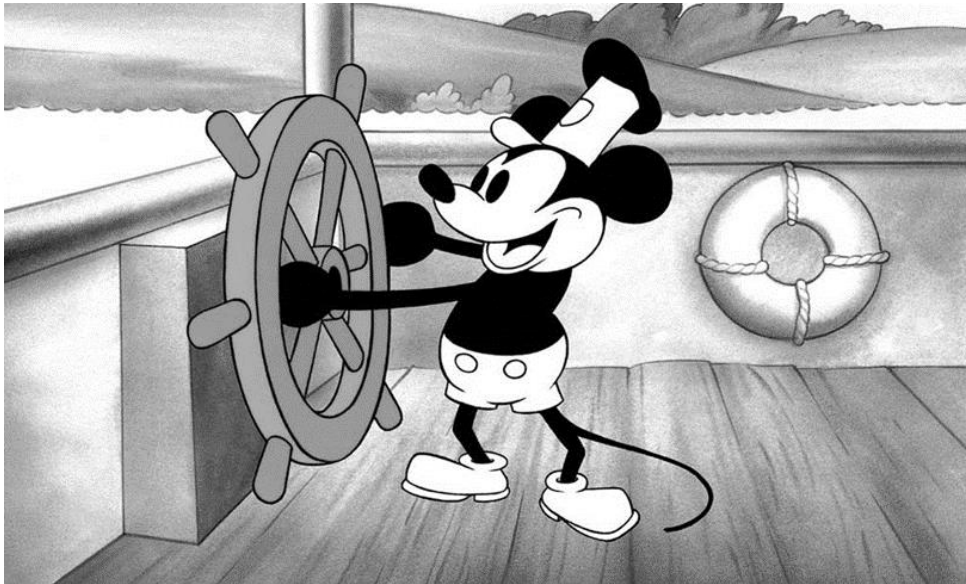
"It's kind of fun to do the impossible."

- Walt Disney



The Power of Imagination

Embrace your vision



First appearance of Mickey Mouse
Steamboat Willie (1928)



Godfather of containerization
1950's

Vision Technology Challenges are Real...

What's so difficult about vision technology?



Puppy or Bagel?

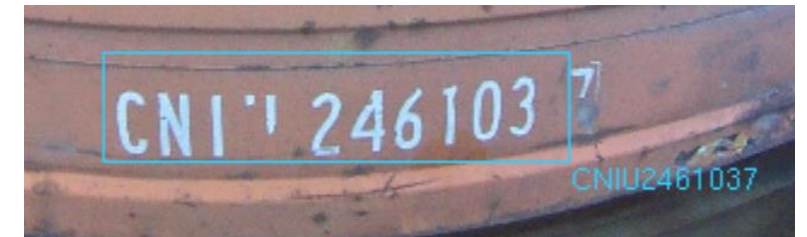
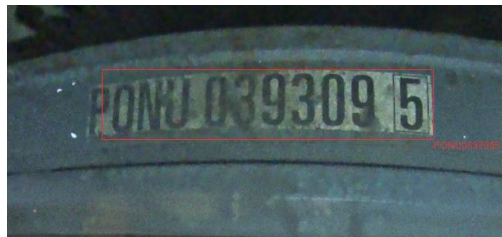


Labradoodle or Fried Chicken?

...But Solved for Terminal Automation

Visy Deep Neural Network (DNN)

- ✓ Automation depends on digitalization
- ✓ Vision technology from Deep Learning
- ✓ 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

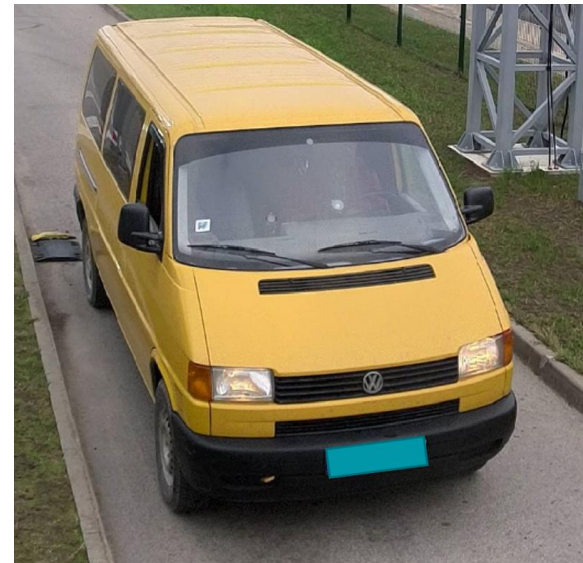


Terminal Automation

Imagination: Impossible 10 years ago

CONTAINER CODE
 ISO CODE
 MGW
 32500KGS
 TARE
 3850KGS
 PAYLOAD
 28650KGS

CORROSIVE
 SEAL



Yellow	Van	VOLKSWAGEN	
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336207

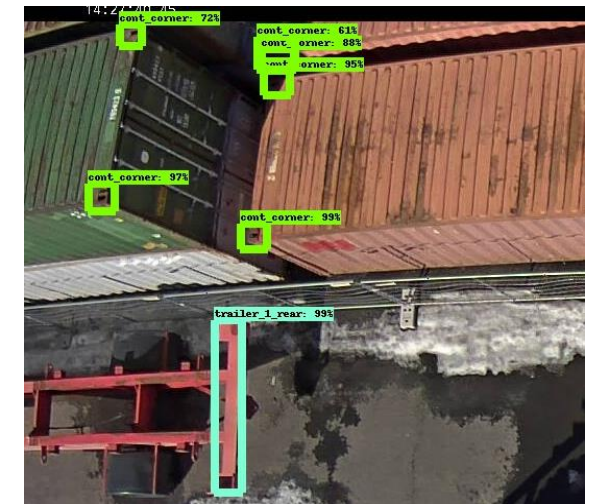
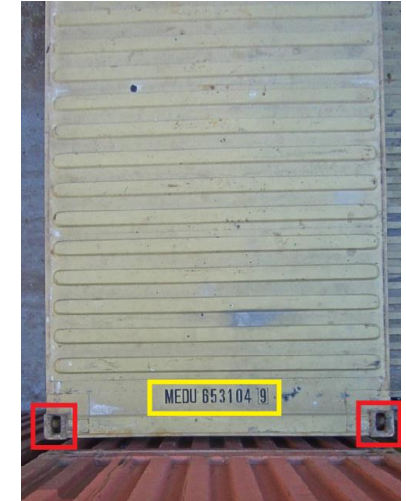


WEIGHT
 WAGON ID
 LENGTH
 MAX VOLUME
 CAPACITY

Terminal Automation

Imagination: Impossible 10 years ago

- ✓ 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*)
- ✓ Twin-20 detection
- ✓ Door orientation
- ✓ Terminal tractor ID
- ✓ Uses CCTV and tablets
- ✓ ID & follow assets (*Visy AREA*)
- ✓ Location on chassis
- ✓ Damage detection
- ✓ Twistlock detection



Terminal Automation

Deep learning for automatic damage detection

- ✓ Damaged containers and cargo cost the industry billions of dollars per year
- ✓ Health, safety, lost productivity/efficiency, insurance claims....
- ✓ What could happen if these boxes went onboard, in the stack, or on the road?
- ✓ ADDS is a natural extension of OCR – uses the same images as the OCR algorithm; no additional hardware required



Terminal Automation

Deep learning for automatic damage detection

08.06.2022 09:26:12




Terminal Automation

Deep learning for automatic damage detection

Visy Access Gate 4.6.0 (Petri Sarpola/VISY)

File View Cameras Search Settings Shortcuts Permits Tools Administration VISY Windows Help

Event Permit Access Alt. Permits (0) Passengers ADDS camera side



All (200) Allowed (200) Denied (0) Query (500) Event Monitor

ID	Time Stamp	Container 1	Container 2	Container 3	Damage Score	Damage Detected	Permi...	First ...	Surn...	Com...	Title	Prime...	Prime...	Cont...	Plates	Com...
60072	08.06.2022 08:26:12	MSKU3338342	MRKU9594226	SUDU7574376	96	Yes										
60156	08.06.2022 12:06:22	FCIU2923943			94	Yes										
60086	08.06.2022 09:24:49	FCIU3884651	MEDU2355403		91	Yes										
60174	08.06.2022 12:36:59	CRXU3309394	CAIU2473792		91	Yes										
60039	08.06.2022 07:18:14	MEDU6345390	FSCU3297756		91	Yes										
60176	08.06.2022 12:49:23	TCLU9977744	HLXU1097427		89	Yes										
60147	08.06.2022 11:40:00	MEDU2600500	CAXU9795787		89	Yes										
60068	08.06.2022 08:12:22	TRLU8954830			87	Yes										
60031	08.06.2022 07:05:34	FCIU2107430	BMOU2789796		85	Yes										
60148	08.06.2022 11:42:48	SUDU7964230	SUDU1499927	MSKU7703839	85	Yes										
60094	08.06.2022 09:49:57	HLXU1175258	UNKNOWN		82	Yes										
60127	08.06.2022 11:06:30	BEAU4462257	FSCU7169183		82	Yes										
60197	08.06.2022 13:31:58	CAXU8120238			81	Yes										

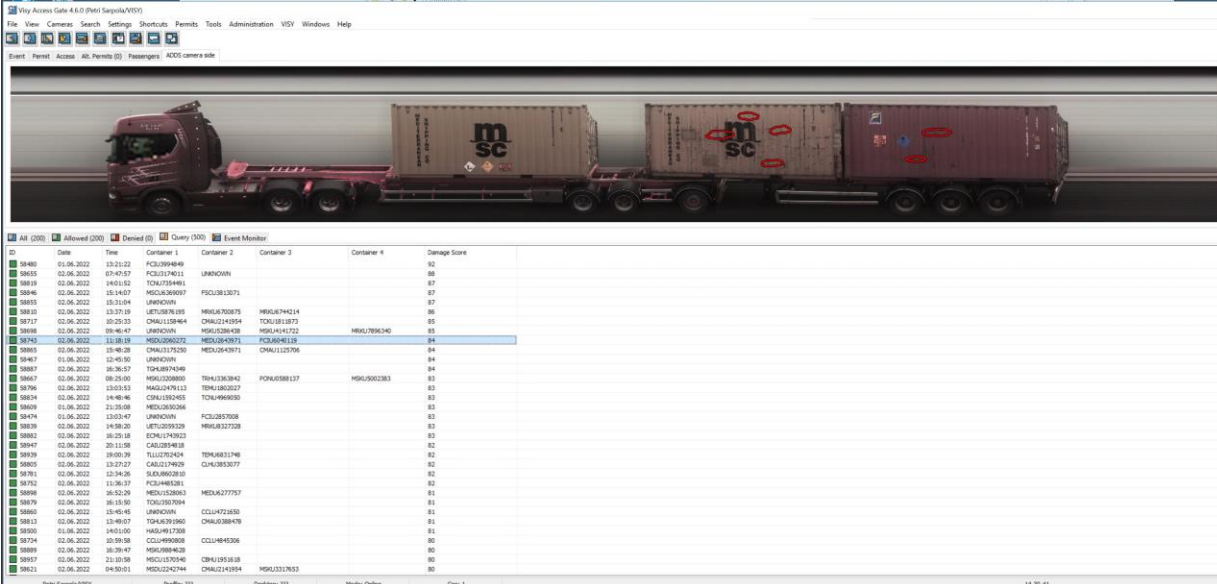
Petri Sarpola/VISY Profile: ??? Desktop: ??? Mode: Online Cps: 1 13.4



ADDS for Ops

The math works

- ✓ 3 boxes on a trailer = 10 visible sides
- ✓ 10,000 boxes = 100,000 images to review – what resources are required to do this?
- ✓ With ADDS, only the images with damage need to be reviewed
- ✓ From 100,000 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	Container 1	Container 2	Container 3	Container 4	Damage Score
58460	02.06.2022	12:32:22	FCU1394949				82
58655	02.06.2022	07:45:57	FCU1174011	UNNOVN			88
58859	02.06.2022	14:01:52	TCU1734961				87
58846	02.06.2022	15:14:07	MSC1369097	FCU13813071			87
58855	02.06.2022	15:31:04	UNNOVN				87
58853	02.06.2022	13:31:29	MTU1876195	MSU16703875	MSU16742114		88
58727	02.06.2022	09:29:33	CHAL1158464	CHAL1214154	TCU11811873		85
58948	02.06.2022	09:46:47	UNNOVN	MSU12264928	MSU1414722	MSU16796240	85
58793	02.06.2022	11:31:38	MSC10900272	MSC10943971	FCU16542138		84
58985	02.06.2022	15:48:28	CHAL1375230	MEU12643971	CHAL1122706		84
58467	02.06.2022	12:45:30	UNNOVN				84
58887	02.06.2022	16:36:57	TGU18974349				84
58967	02.06.2022	08:21:48	MSU12268867	TRU11381842	PCHU1088117	MSU1002383	84
58796	02.06.2022	13:03:53	MAG12479113	TRU11820227			83
58824	02.06.2022	14:48:46	CNU11392465	TCU14969059			83
58669	02.06.2022	21:33:08	MEU1000044				83
58474	02.06.2022	13:03:47	UNNOVN	FCU12857008			83
58839	02.06.2022	14:58:28	MTU12299129	MSU18277028			83
58882	02.06.2022	16:25:18	ECH11743823				83
58947	02.06.2022	20:11:58	CAU12849418				82
58939	02.06.2022	09:00:39	TLU1076214	TRU140811748			82
58805	02.06.2022	13:27:27	CAL11746209	CUU13853077			82
58781	02.06.2022	12:24:26	SUJ18602018				82
58782	02.06.2022	11:36:37	FCU14682811				82
58896	02.06.2022	16:52:26	MEU1529053	MEU16277757			81
58879	02.06.2022	16:15:50	TCU1397914				81
58860	02.06.2022	15:45:45	UNNOVN	CCU14721650			81
58813	02.06.2022	13:46:07	TGU16379560	CHAL1038478			81
58950	02.06.2022	14:01:00	HAG14617308				80
58724	02.06.2022	10:39:58	CCU1445006				80
58889	02.06.2022	16:39:47	MSU18946138				80
58957	02.06.2022	21:30:58	MSC11370140	CHAL11931838			80
58923	02.06.2022	04:50:01	MSU1242744	CHAL1214154	MSU12213853		80



ADDS for Ops

Instant results for clerks

Input



Damage score 91.7 %



Detections



ADDS automatically circles the damage and gives a score

Case Study: TPS Surabaya

Site of the world's first ADDS portal

Terminal background

- ✓ Major terminal in Indonesia – 1.4 mil TEU
- ✓ Incumbent OCR system with low read rates
- ✓ Strong focus on customer service

3 key challenges

- ✓ How to increase throughput capacity?
- ✓ How to reduce turnaround times?
- ✓ How to protect from damage claims?



Case Study: TPS Surabaya

Site of the world's first ADDS portal



Visy Solution

- ✓ 6 Gate Lanes with: Container ID, LPR, Seal presence, Door direction, Dangerous goods label ID
- ✓ 2 ADDS Lanes: ADDS on quay, 1 lane implemented, 2nd lane on delivery

Results

- ✓ Export Gate transaction time -33%
- ✓ Import Gate transaction time -60%
- ✓ Immediate alerts for cargo damage
- ✓ Better customer service and relations



Closing Thought

The importance of imagination

"Imagination is more important than knowledge.... knowledge is limited to all we know..."

Imagination embraces the entire world, and all there ever will be to know and understand."

– Albert Einstein





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CONTACT

John Lund

Sales & Marketing Director (Global)

John.lund@visy.fi

+358 50 477 9504

Visy Oy

Hatanpään valtatie 34 D, 3rd Floor

33100 Tampere, FINLAND

Tel.: +358 (0)3 211 0403

www.visy.fi | sales@visy.fi

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