

VISY

AUTOMATIC DETECTION OF CONTAINER DAMAGE

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AUTOMATED ACCESS AND AREA CONTROL

TOC Global Showcase
3 June 2021



Expand | your vision

CONTENTS

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- Terminal Operations
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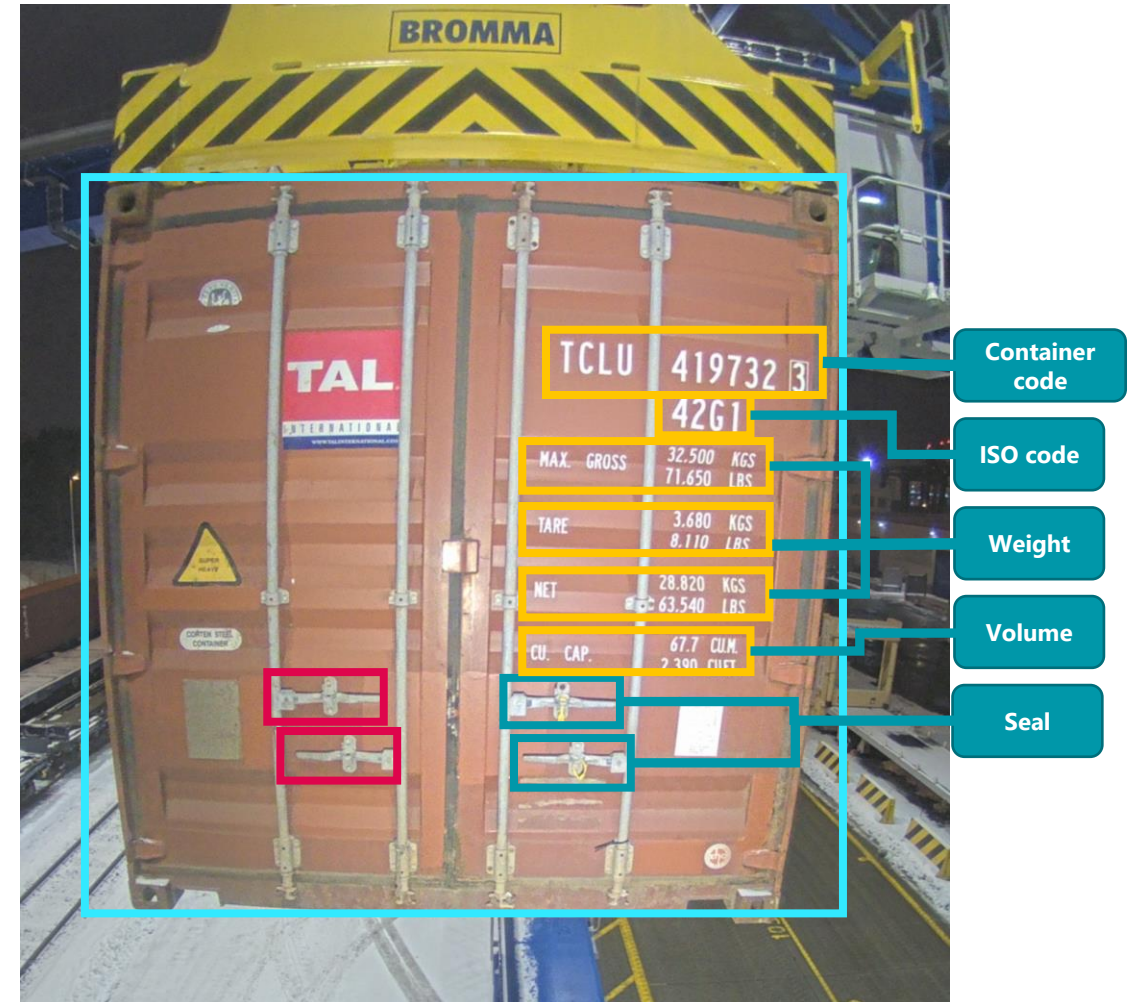
Visy at a Glance

- Vision technology experts: Deep-learning projects since 2013
- Access/Area automation for logistics
- Visy's end-to-end deep neural network (DNN) is used for many identification and recognition tasks

5,000,000+
control decisions / every day

Innovating
since 1994

25+
countries



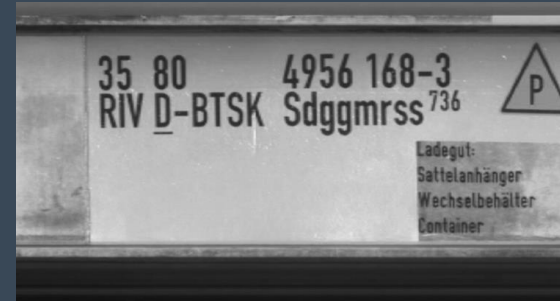
Vision Technology

Collect and Share data

- OCR results (LPR, Box ID, etc.)
- Gate / Rail / Quay / Yard => TOS
- And now **DAMAGE DETECTION**

Outcome focus

1. Scalable, repeatable, predictable, profitable operations
2. Improve KPI's
3. Provide world-class service to your customers



State of Vision Technology in 2021



Doughnut vs Mushroom

State of Vision Technology in 2021



Battleship vs Rock Formation

State of Vision Technology in 2021



Tree Branches vs Loch Ness Monster

State of Vision Technology in 2021

- In the area of facial recognition, the developments are incredible
- Machines are more accurate and faster than humans

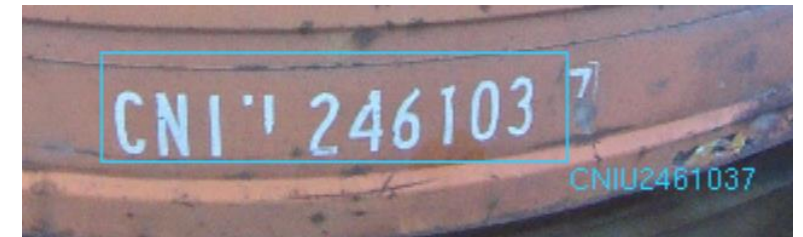
What happens when we apply this technology to port operations?

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

Terminal Operations



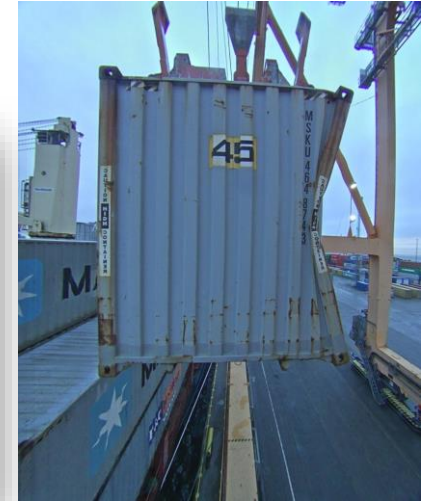
- OCR and Imaging Technology
- Visy DNN correctly recognizes very bad box ID's faster than humans
- 90% is easy, 99% is difficult; What impact does 9 points have?
- These sample pics are raw reads from Visy systems



Terminal Operations



- OCR and Imaging Technology
- What are the implications of these boxes going into the stacks or out of the terminal?



VISY

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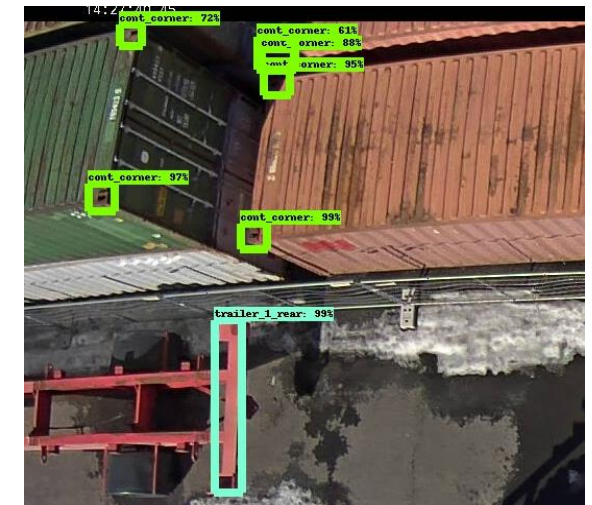
Terminal Operations



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)
- Twin-20 detection
- Door orientation
- Dangerous goods
- Uses CCTV and tablets
- Detect ID and follow the asset or cargo (Visy AREA)
- Location on Chassis

...and now....



CONTAINER DAMAGE DETECTION

Visy ADDS (Automatic Damage Detection System) is the first vision-based solution for automated damage alerts

- Heatmap representation for **dents, bulges, extreme rust, holes**
- Segmentation for **heavy structural damage**
- System is **Training-based**: Can be tailored for new damage types



TPS - Surabaya



“R.E.L.I.A.B.L.E. Terminal with Service Excellence”

Major terminal in Indonesia - 1.4 mil TEU

Incumbent OCR system with low read rates

3 key challenges:

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





TPS - Surabaya

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 services and relations



Input



Damage score 91.7 %



Detections



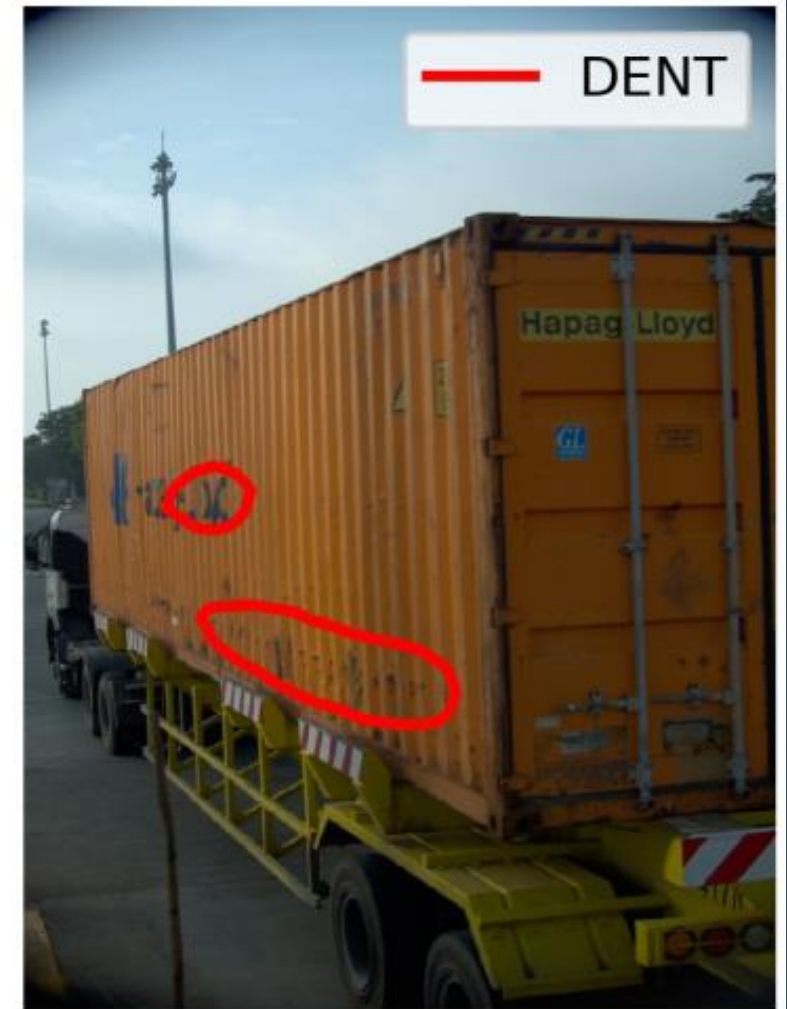
Input



Damage score 91.9 %



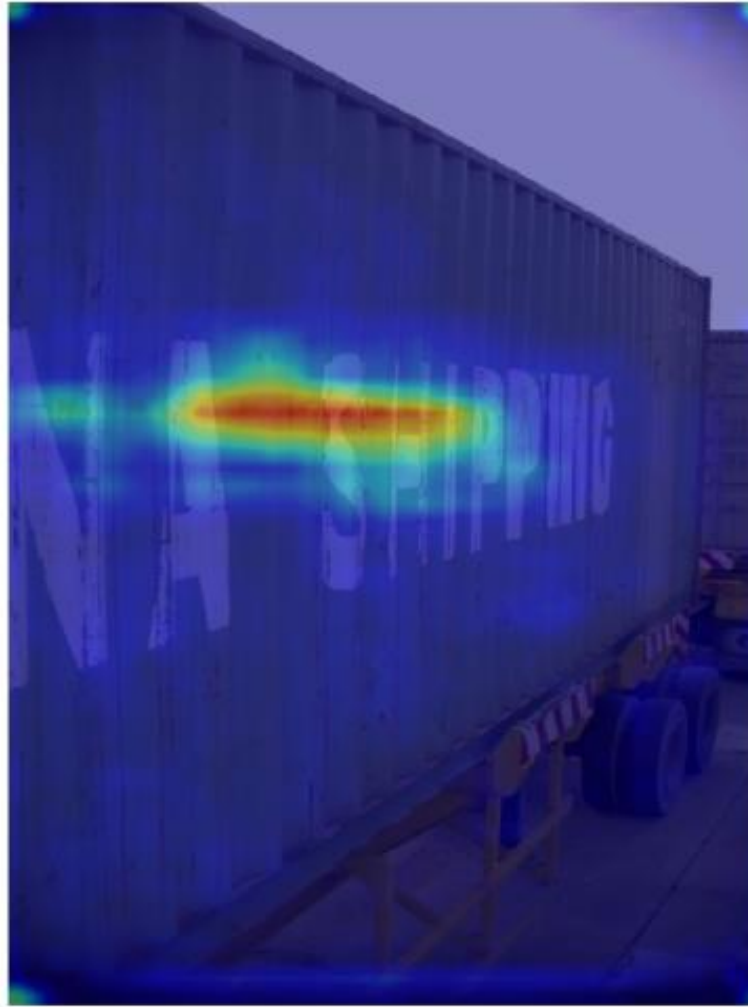
Detections



Input



Damage score 91.4 %



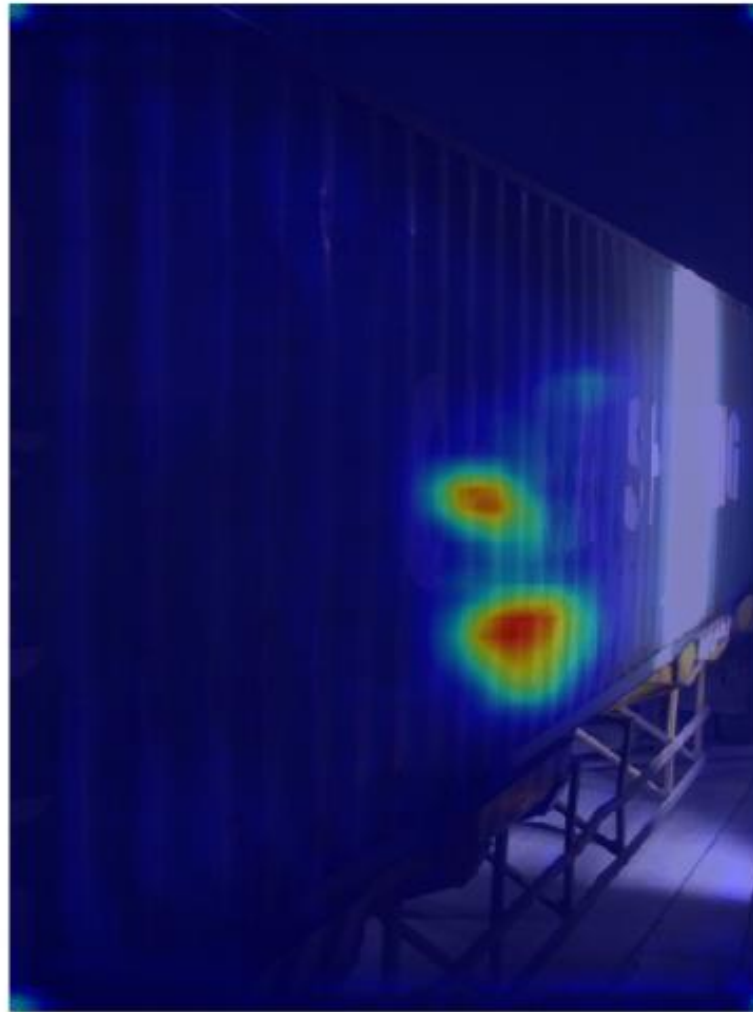
Detections



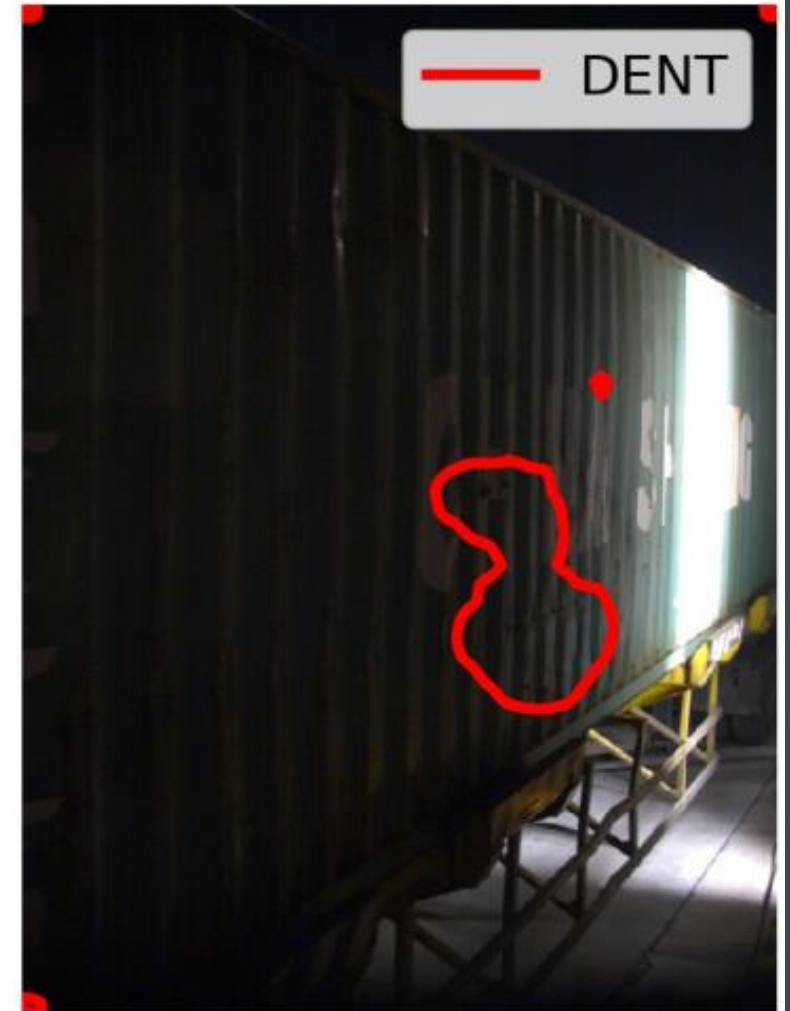
Input



Damage score 92.0 %



Detections



EVENT VIEW

Visy Access Gate 4.4.9 (primus primus/Primus)

FileViewCamerasSearchSettingsToolsAdministrationWindowsHelp

Event


Permit

Access

Alt. Permits (0)

Passengers

Left LS



Event


Permit

Access

Alt. Permits (0)

Passengers

Front Color



All (200)

Query (272)

Event Monitor

ID	Time Stamp	Date	Time	Checkpoint	Front License ...	Container 1	Container 2	Container 3	Container 4	ISO 1	ISO 2	ISO 3	ISO 4	Dam...	Damage Score	Acce...
1300088	02.06.2021 13:04:01	02.06.2021	13:04:01	ADDS 1	196	WHSU2662960 / 22G1	WHSU2377216 / 22G1	TCLU735...	BSIU3075103 / 22G1	22G1	22G1	22G1	22G1	Yes	73	
1300086	02.06.2021 13:03:51	02.06.2021	13:03:51	ADDS 1	204	TCNU5560560 / 45G1	GAOU6510300 / 45G1			45G1	45G1			Yes	75	
1300078	02.06.2021 13:02:30	02.06.2021	13:02:30	ADDS 1	179	SEGU6881871 / 45G1	TCNU6518775 / 45G1			45G1	45G1			Yes	67	
1300074	02.06.2021 13:01:47	02.06.2021	13:01:47	ADDS 1	229	SIKU3047492 / 22G1	TEMU2195648 / 22G1	TEMU085...		22G1	22G1	22G1		Yes	86	
1300072	02.06.2021 13:00:56	02.06.2021	13:00:56	ADDS 1	174	CBHU8550598 / 45G1	APHU6629091 / 45G1			45G1	45G1			Yes	90	
1300067	02.06.2021 12:59:28	02.06.2021	12:59:28	ADDS 1	191	TCKU3244399 / 22G1	BSIU2754394 / 22G1	WFHU14...	TCLU3883036 / 22G1	22G1	22G1	22G1	22G1	Yes	86	
1300064	02.06.2021 12:58:59	02.06.2021	12:58:59	ADDS 1	207	FDCU0608454 / 45G1	TEMU7360576 / 45G1			45G1	45G1			Yes	88	
1300054	02.06.2021 12:55:31	02.06.2021	12:55:31	ADDS 1	181	TRHU4765044 / 45G1	CGMU5009235 / 45R1			45G1	45R1			Yes	87	
1300047	02.06.2021 12:53:50	02.06.2021	12:53:50	ADDS 1	227	TCLU1330345 / 45R1	DFSU7025853 / 45G1			45R1	45G1			Yes	84	
1300044	02.06.2021 12:52:52	02.06.2021	12:52:52	ADDS 1	202	OOLU8885848 / 45G1	TCNU5334644 / 45G1			45G1	45G1			Yes	83	
1300041	02.06.2021 12:52:10	02.06.2021	12:52:10	ADDS 1	180	TLLU5474035 / 45G1	DFSU4379051 / 42G1			45G1	42G1			Yes	78	

primus primus/Primus

Profile: ???

Desktop: ???

Mode: Online

Cps: 4

17:21:56

EVENT VIEW

Visy Access Gate 4.4.9 (primus primus/Primus)

File View Cameras Search Settings Tools Administration Windows Help

Event

Permit

Access

Alt. Permits (0)

Passengers

Left ADD

Event

Permit

Access

Alt. Permits (0)

Passengers

Front Color

All (200)

Query (272)

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1300078	02.06.2021 13:02:30	02.06.2021	13:02:30	ADDS 1	179	SEGU6881871 / 45G1	TCNU6518775 / 45G1			45G1	45G1			Yes	67	
1300074	02.06.2021 13:01:47	02.06.2021	13:01:47	ADDS 1	229	SIKU3047492 / 22G1	TEMU2195648 / 22G1	TEMU085...		22G1	22G1	22G1		Yes	86	
1300072	02.06.2021 13:00:56	02.06.2021	13:00:56	ADDS 1	174	CBHU8550598 / 45G1	APHU6629091 / 45G1			45G1	45G1			Yes	90	
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1300044	02.06.2021 12:52:52	02.06.2021	12:52:52	ADDS 1	202	OOLU8885848 / 45G1	TCNU5334644 / 45G1			45G1	45G1			Yes	83	
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primus primus/Primus

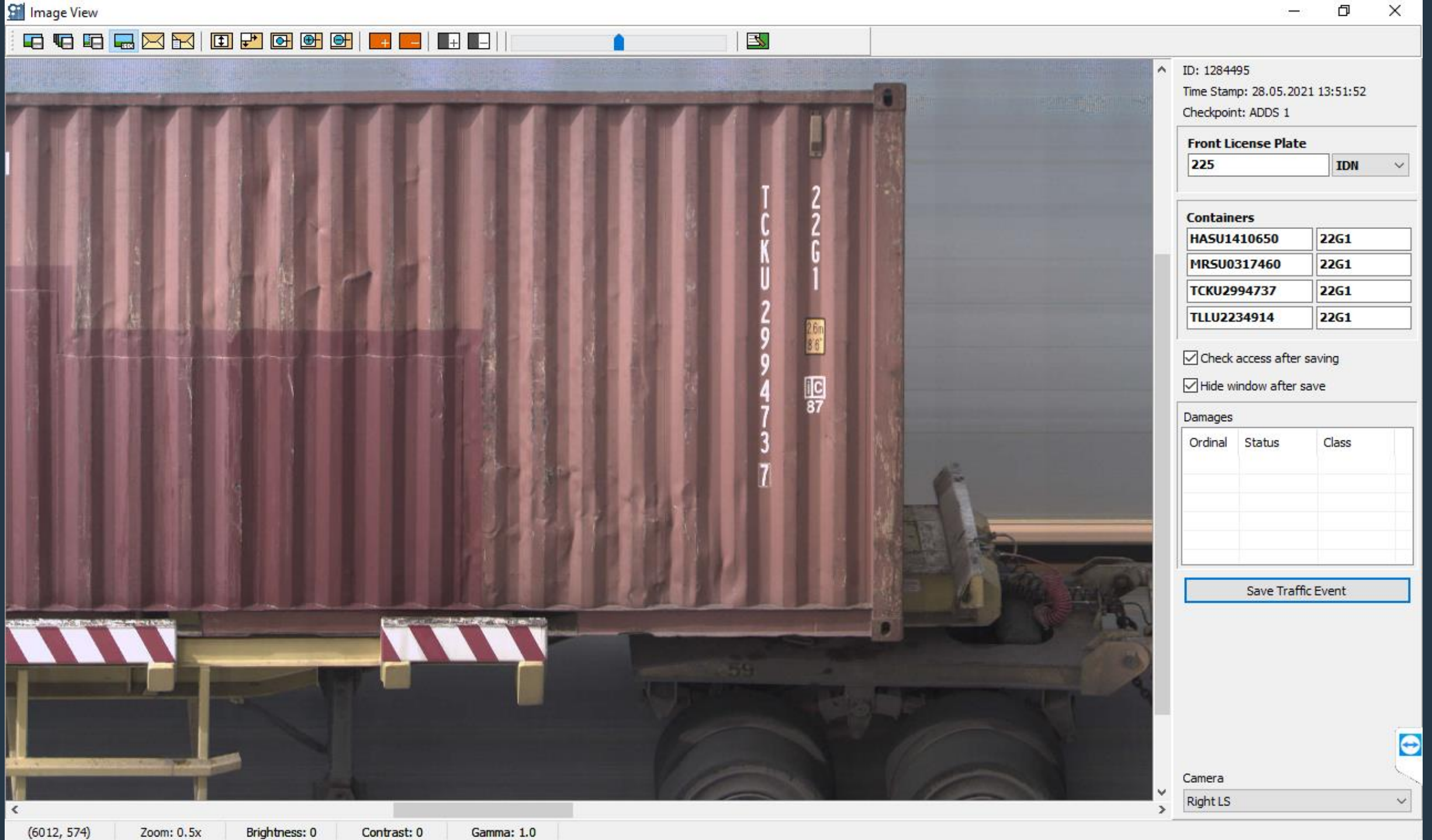
Profile: ???

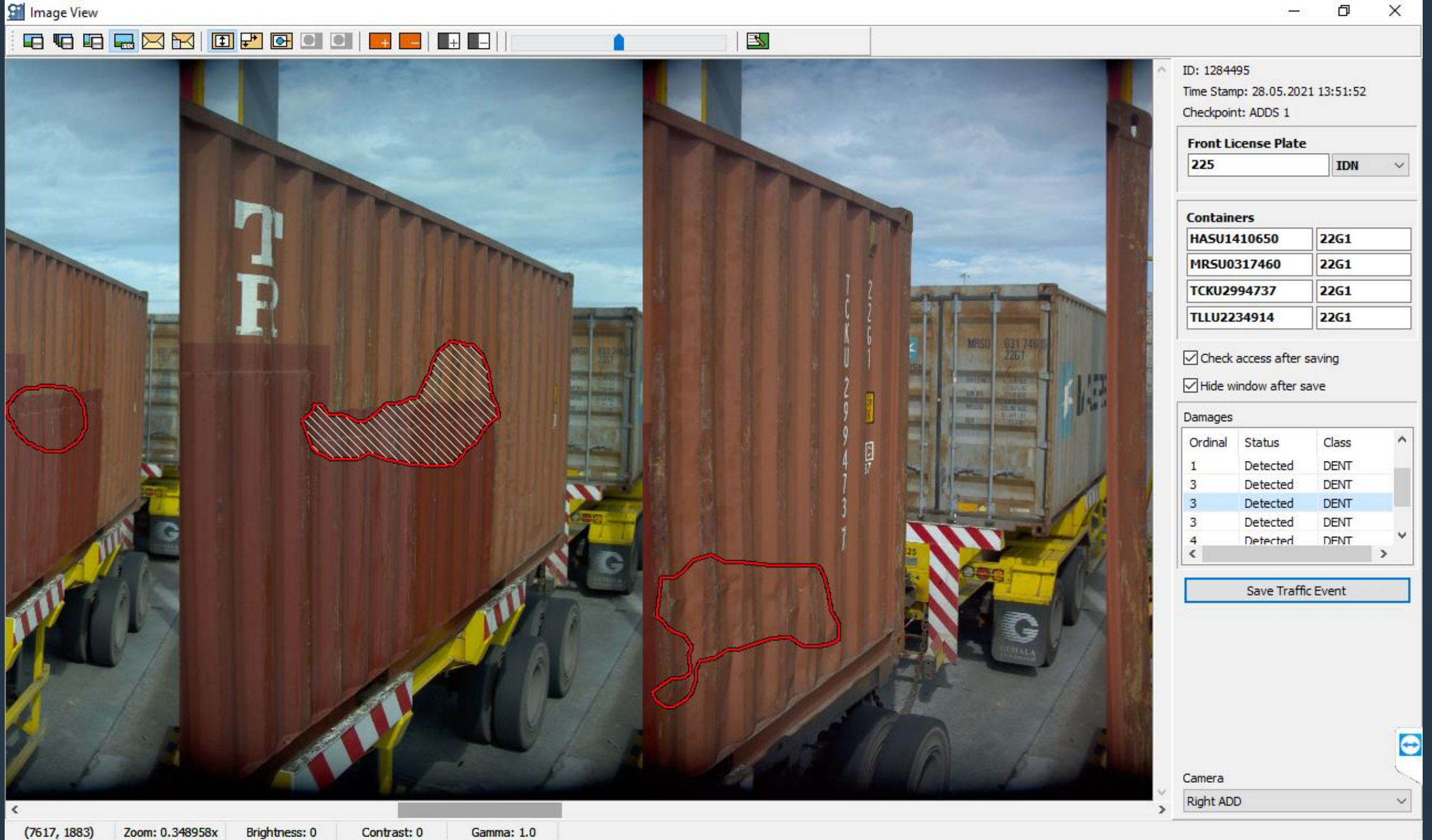
Desktop: ???

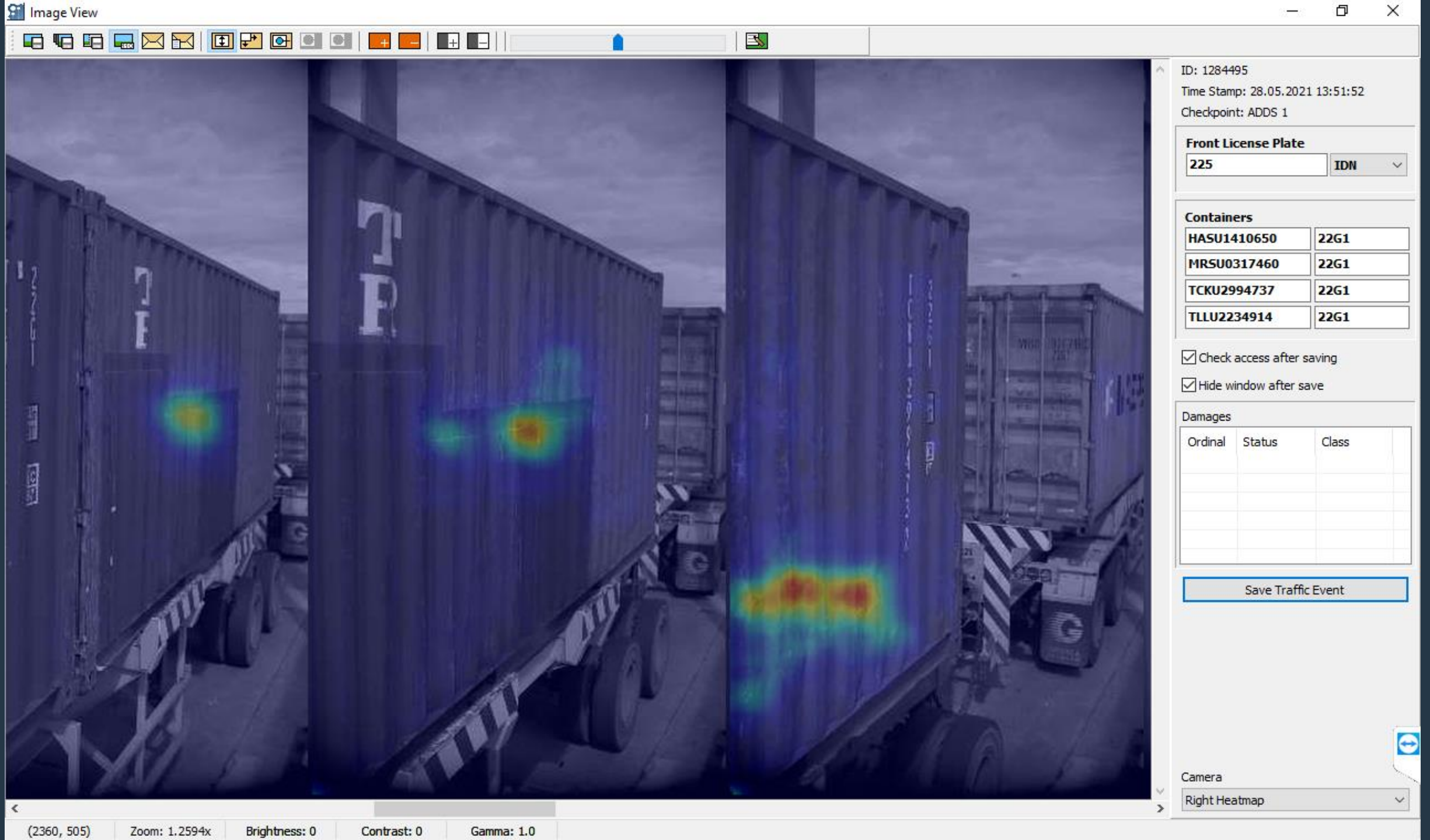
Mode: Online

Cps: 4

17:23:13







ID: 1284495

Time Stamp: 28.05.2021 13:51:52

Checkpoint: ADDS 1

Front License Plate

225 IDN

Containers

HASU1410650	22G1
MRSU0317460	22G1
TCKU2994737	22G1
TLLU2234914	22G1

☒ Check access after saving

☒ Hide window after save

Damages

Ordinal	Status	Class	

Save Traffic Event

Camera

Right Heatmap

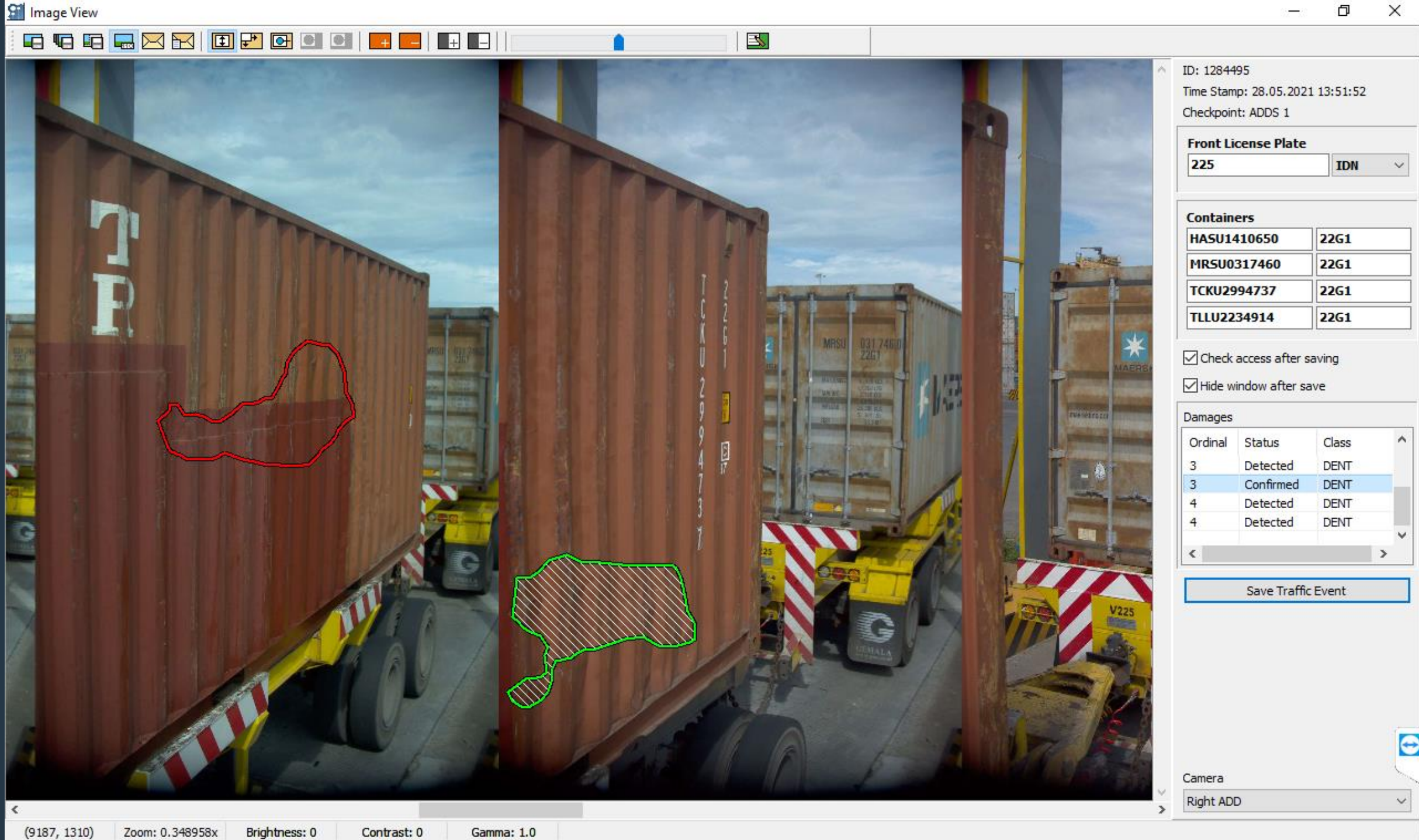
(2360, 505)

Zoom: 1.2594x

Brightness: 0


Contrast: 0

Gamma: 1.0



HEATMAP VIEW

Image View



ID: 990842
Time Stamp: 03.03.2021 15:34:47
Checkpoint: ADDS 1

Front License Plate

203 IDN

Containers

BEAU2127645	22G1
EGHU5007150	45R1

☒ Check access after saving
☒ Hide window after save

Damages

Ordinal	Status	Class

Save Traffic Event

Camera
Right Heatmap

(371, 518) Zoom: 1.09398x Brightness: 0 Contrast: 0 Gamma: 1.0

EDIT AND CONFIRM FUNCTIONALITIES

Image View



ID: 990842
Time Stamp: 03.03.2021 15:34:47
Checkpoint: ADDS 1

Front License Plate

203 IDN

Containers

BEAU2127645	22G1
5007150	45R1

☒ Check access after saving
☒ Hide window after save

Damages

Ordinal	Status	Class
1	Detected	DENT
1	Detected	DENT
2	Detected	DENT
2	Detected	DENT
2	Detected	DENT
2	Detected	DENT


Save Traffic Event

Camera
Right ADD

(3160, 548) Zoom: 0.303125x Brightness: 0 Contrast: 0 Gamma: 1.0

EDIT AND CONFIRM FUNCTIONALITIES

Image View



ID: 990872
Time Stamp: 03.03.2021 15:40:34
Checkpoint: ADDS 1

Front License Plate

213

IDN

Containers

EMCU5372142	45R1
EMCU5297814	45R1

☒ Check access after saving
☒ Hide window after save

Damages

Ordinal	Status	Class	
0	Confirmed	DENT	

Save Traffic Event

Camera
Top ADD

(27544, 1884)

Zoom: 0.303125x

Brightness: 0

Contrast: 0

Gamma: 1.0

An aerial night photograph of a container ship docked at a port. The ship's deck is illuminated with bright lights, and its hull is visible. A large gantry crane stands over the ship. The water is dark, and the port area is lit up. The overall scene is industrial and nocturnal.

IMPLICATIONS FOR THE INDUSTRY

Increase revenue for repair operations: Flag and direct damaged boxes for repair

Tools to share container status online with customers

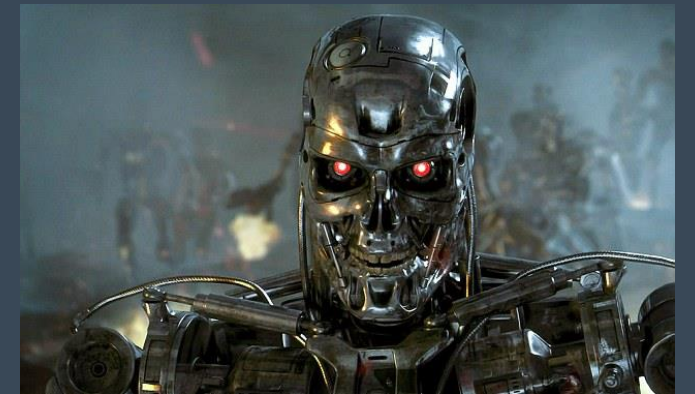
Compare box condition between sites

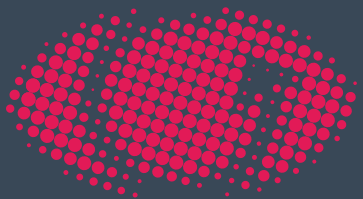
Gate staff can manage more lanes – truly automatic lanes

Prevent structurally damaged boxes from going into stack or on ships

Meet IICL and Container Owner's Association guidelines

Every day is becoming more like a 1980's Arnold film...





VISY

Thank you!

**Contact us for a live demo
Videos on new website!**

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