

# Deck Management

Summer Project Presentation

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# Disposition



The summer project task – Automatization of Deck Management



Problem decomposition



Results

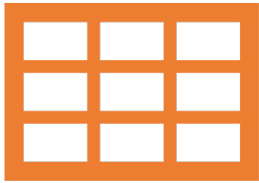


Further improvements



Refinement of Deck Management COG

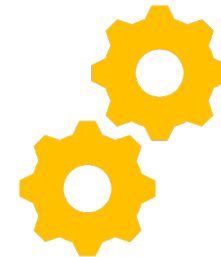
# The task – Starting point



Base: Excel sheet containing information about Cargo



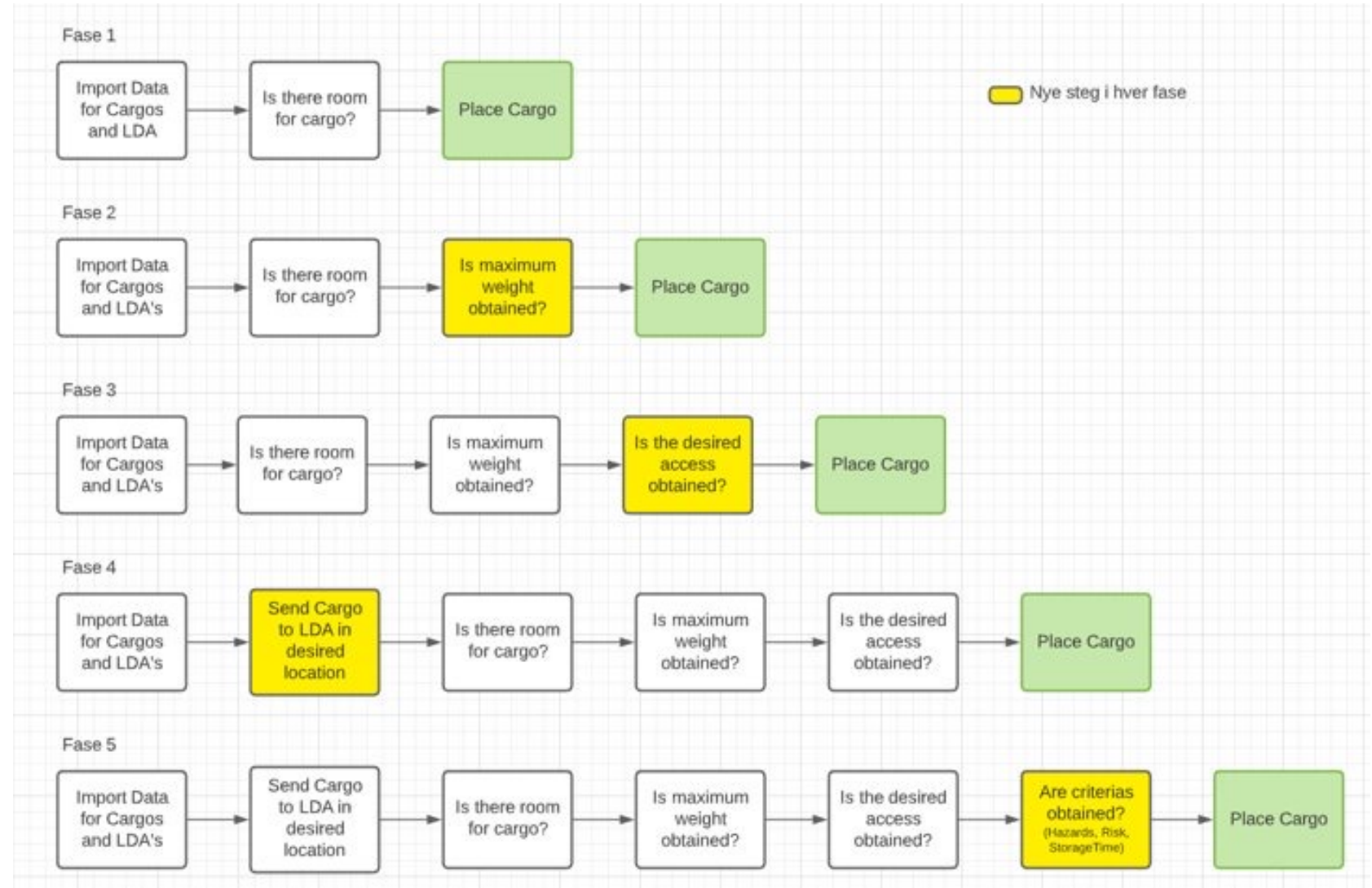
5-phase outline of the criteria for the program' provided by Tore Kvam



Deck Management COG

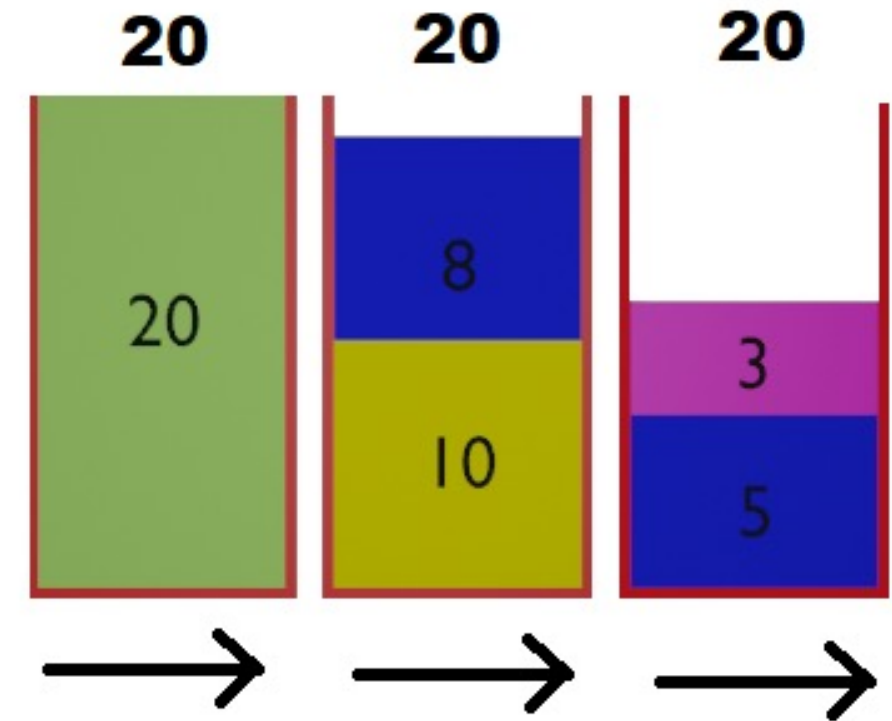
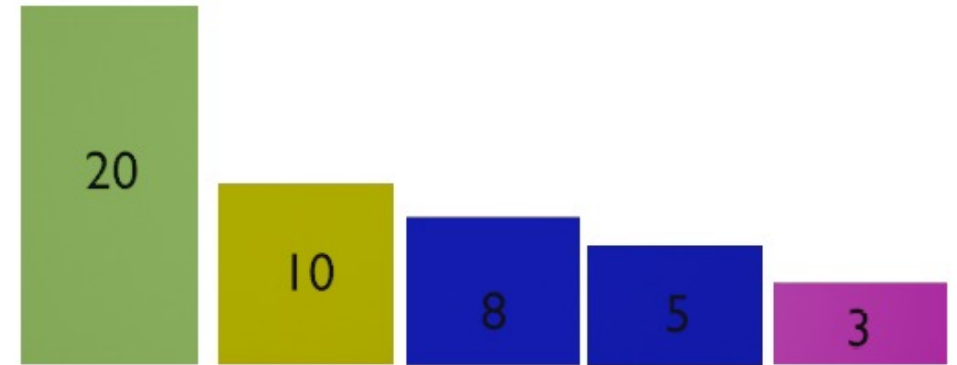
# 5 Phases

- Placing
- Weight
- Access
- Location
- Hazards/Risk/  
Storage Time

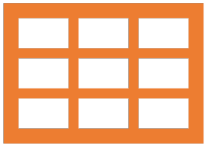


# Research

- Excel program
- Bin Packaging Problem
- First-Fit Decreasing



# Program



## Input:

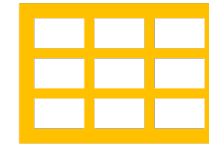
Excel sheet of LDA

Excel sheet of Cargos



## Program:

Script calculating placement

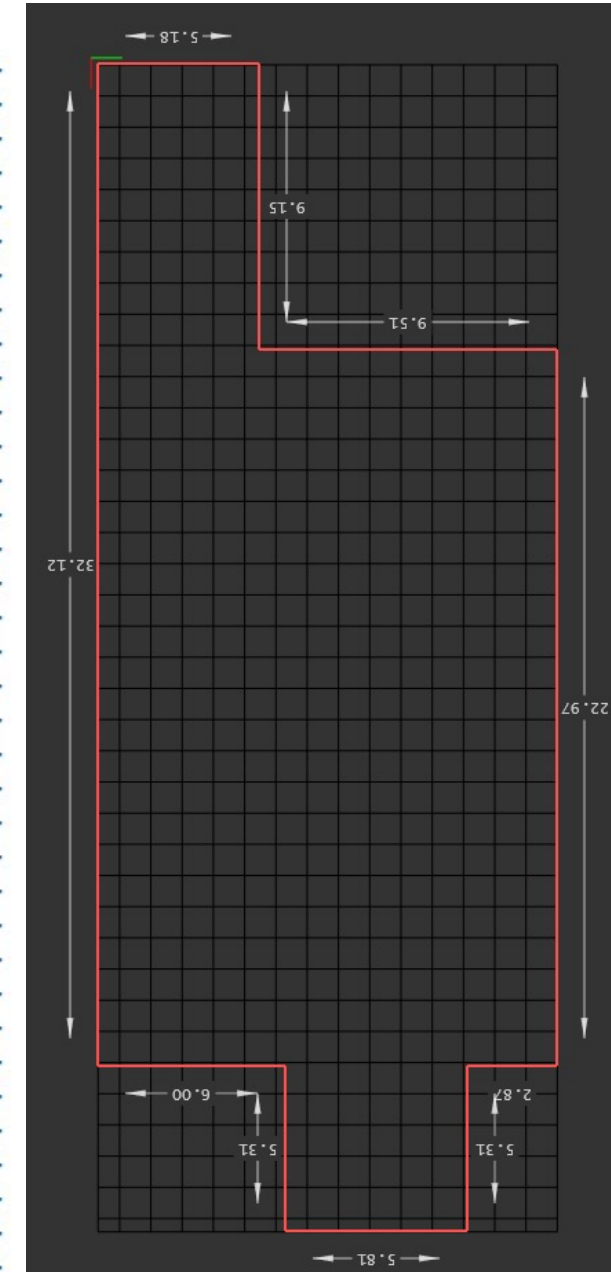
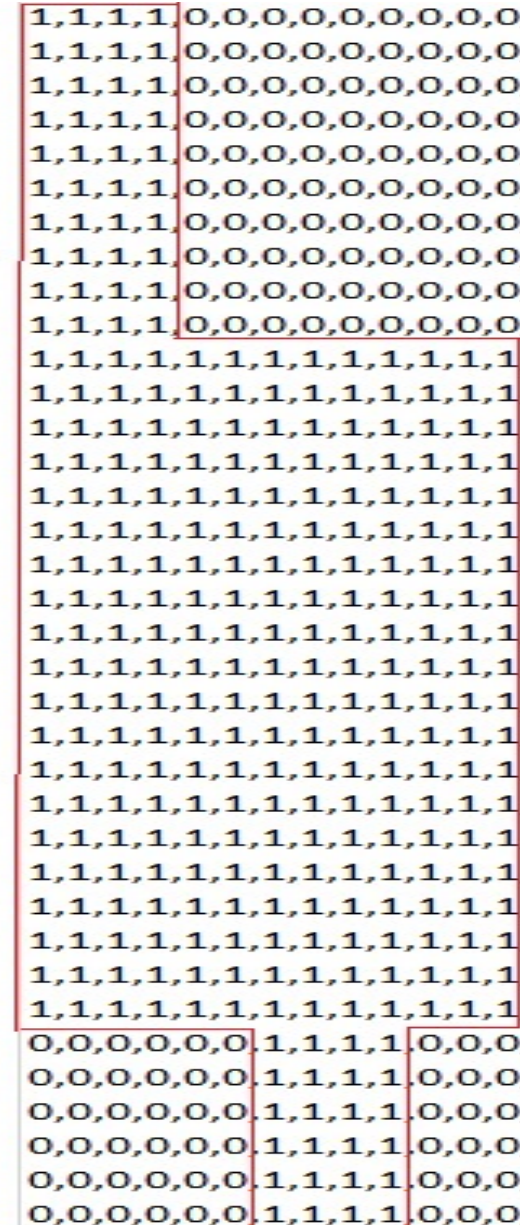


## Output:

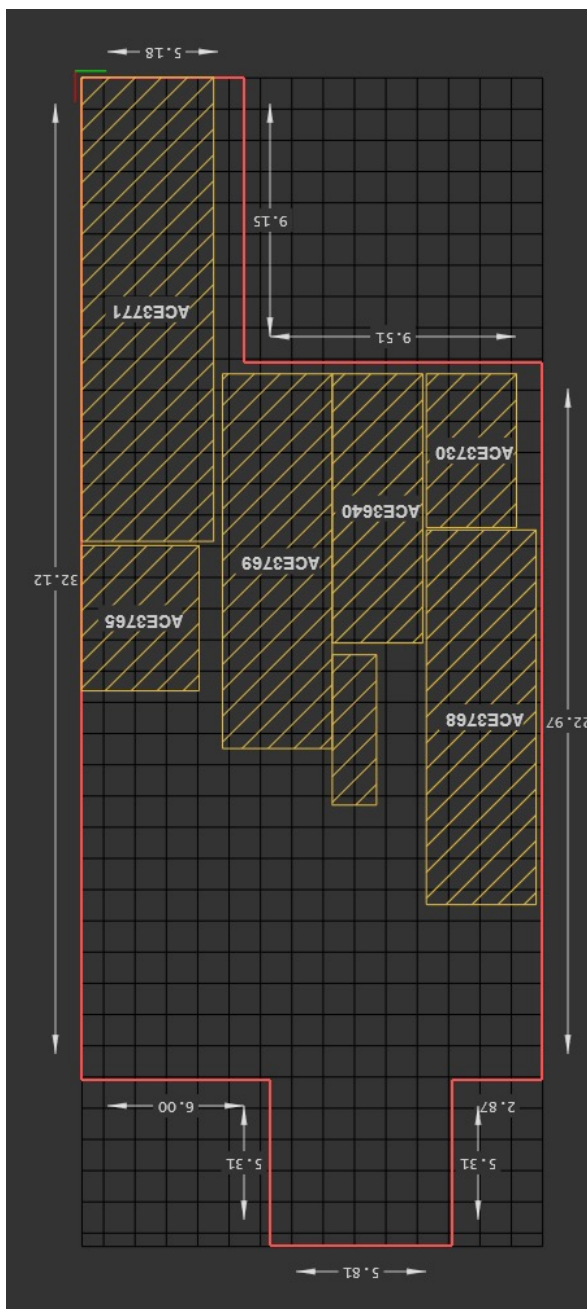
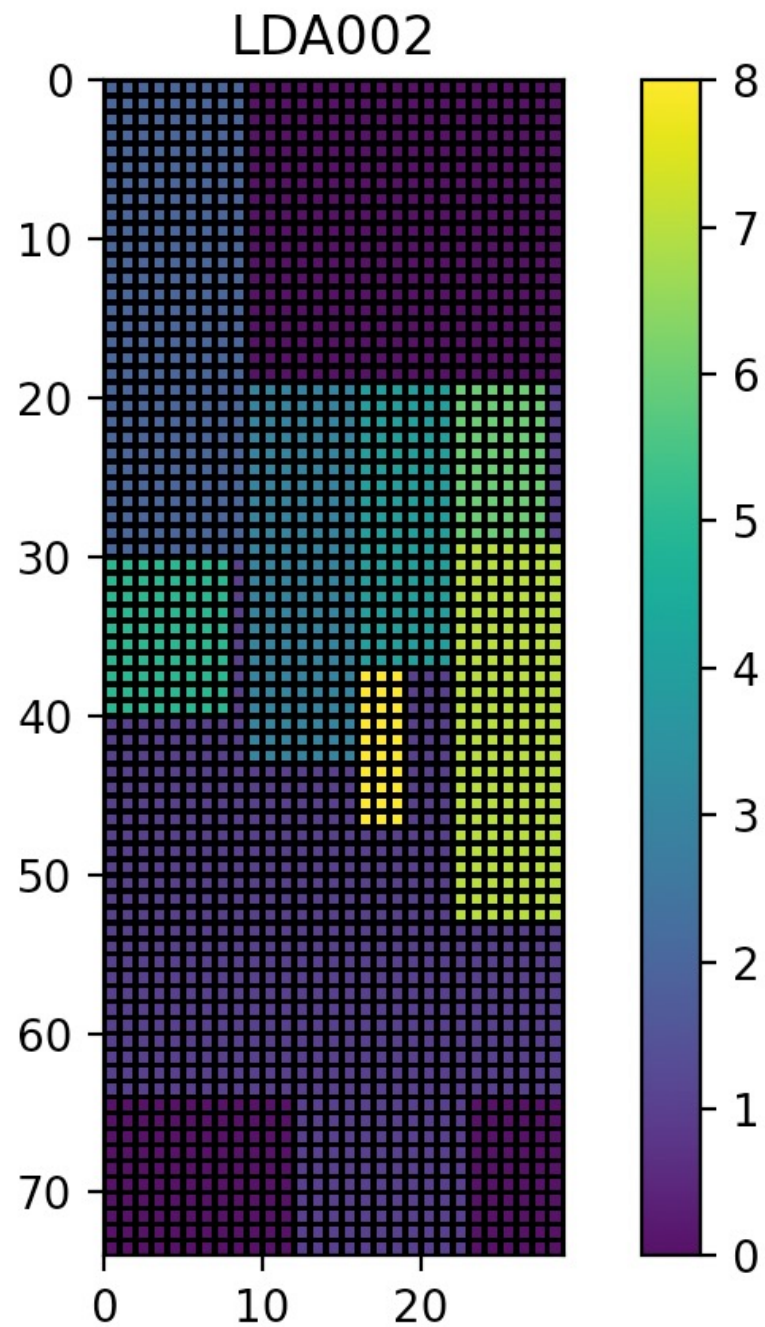
Excel sheet with cargo placement

# Data Handling / Phase 1

- Defining LDA as matrices
- First-Fit Decreasing
- Placing cargo
- Rotating cargo







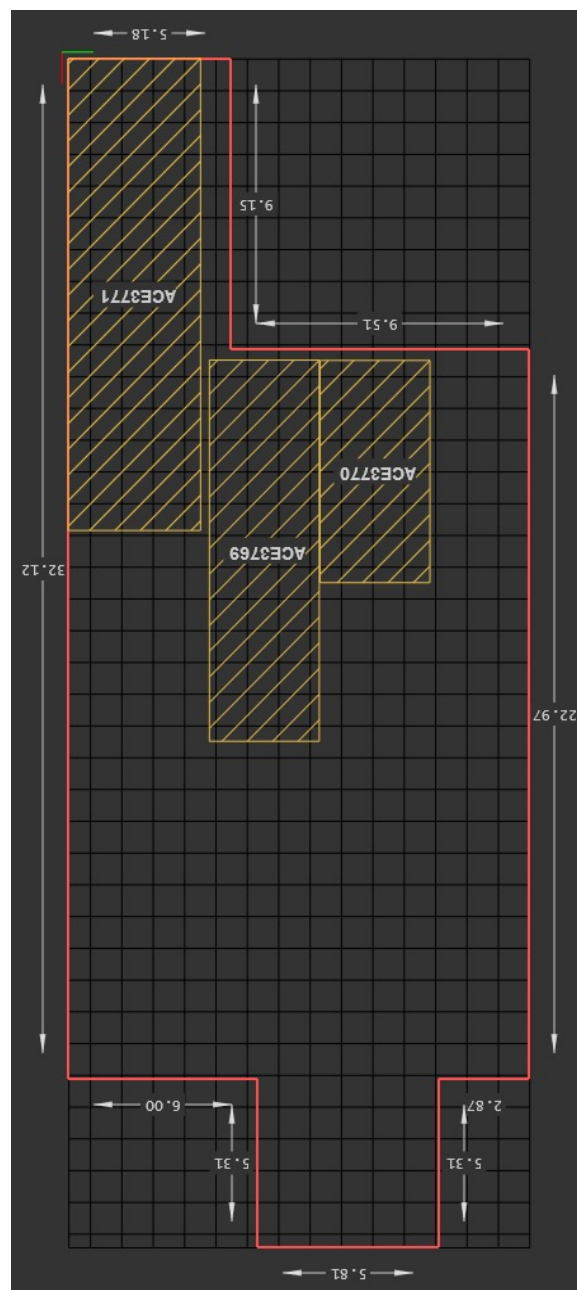
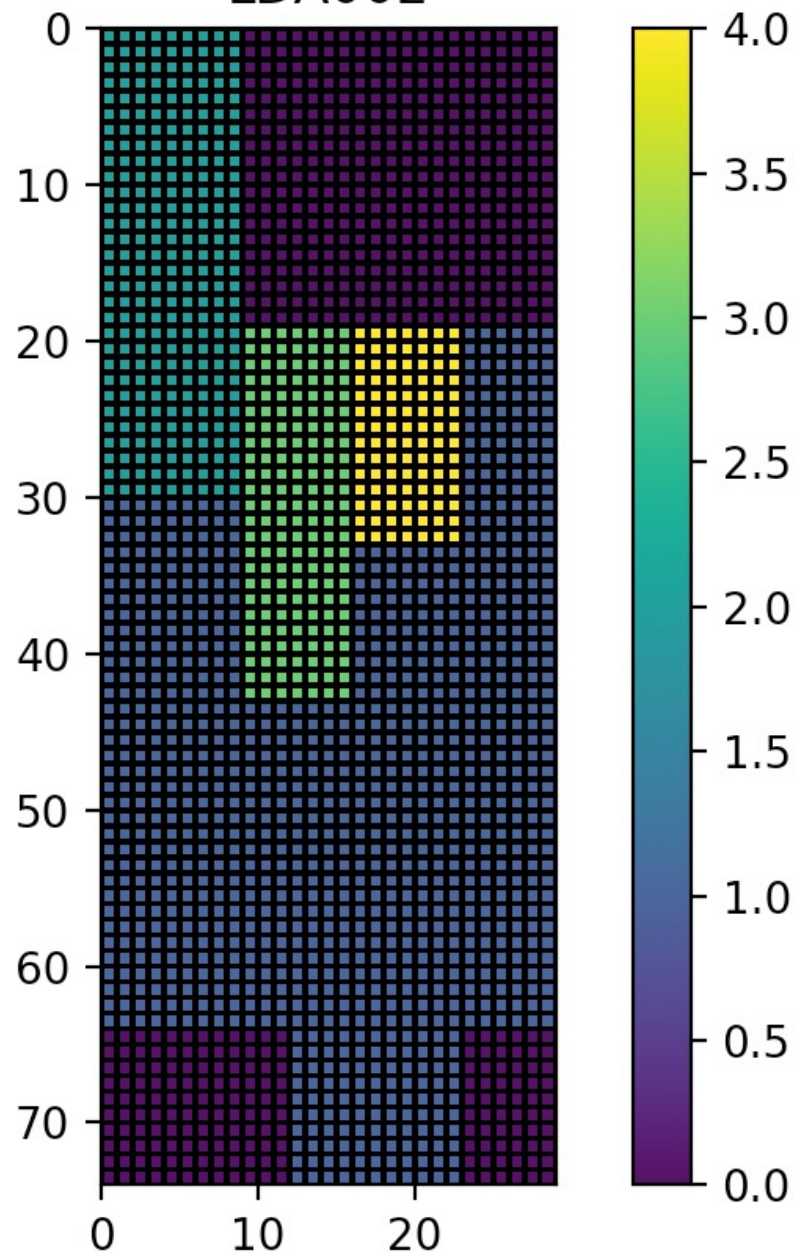
```
Moon Pool
LDA002 [ACE3771, ACE3769, ACE3640, ACE3730, ACE3768, ACE3726]
Weight remaining: -70455.0
ACE3771 30 9 Moon Pool
ACE3769 24 7 Moon Pool
ACE3640 18 6 Moon Pool
ACE3765 10 8 Moon Pool
ACE3730 10 6 Moon Pool
ACE3768 24 7 Moon Pool
ACE3726 10 3 Moon Pool
```



# Phase 2

- Weight Limit

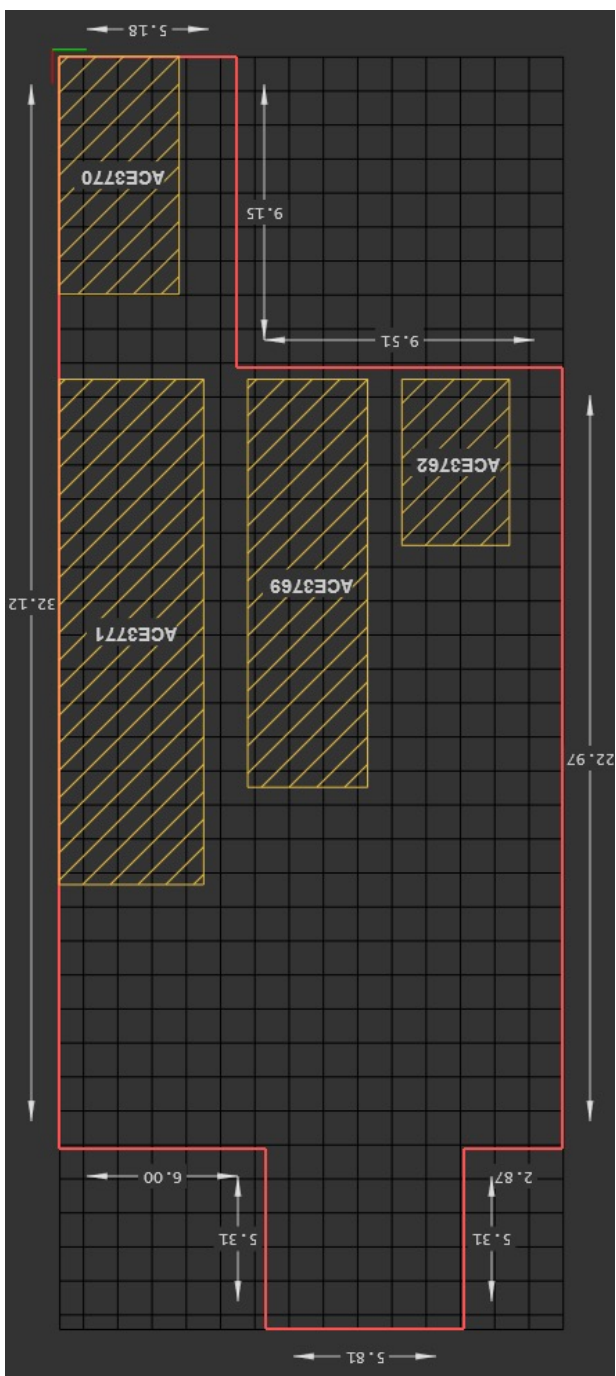
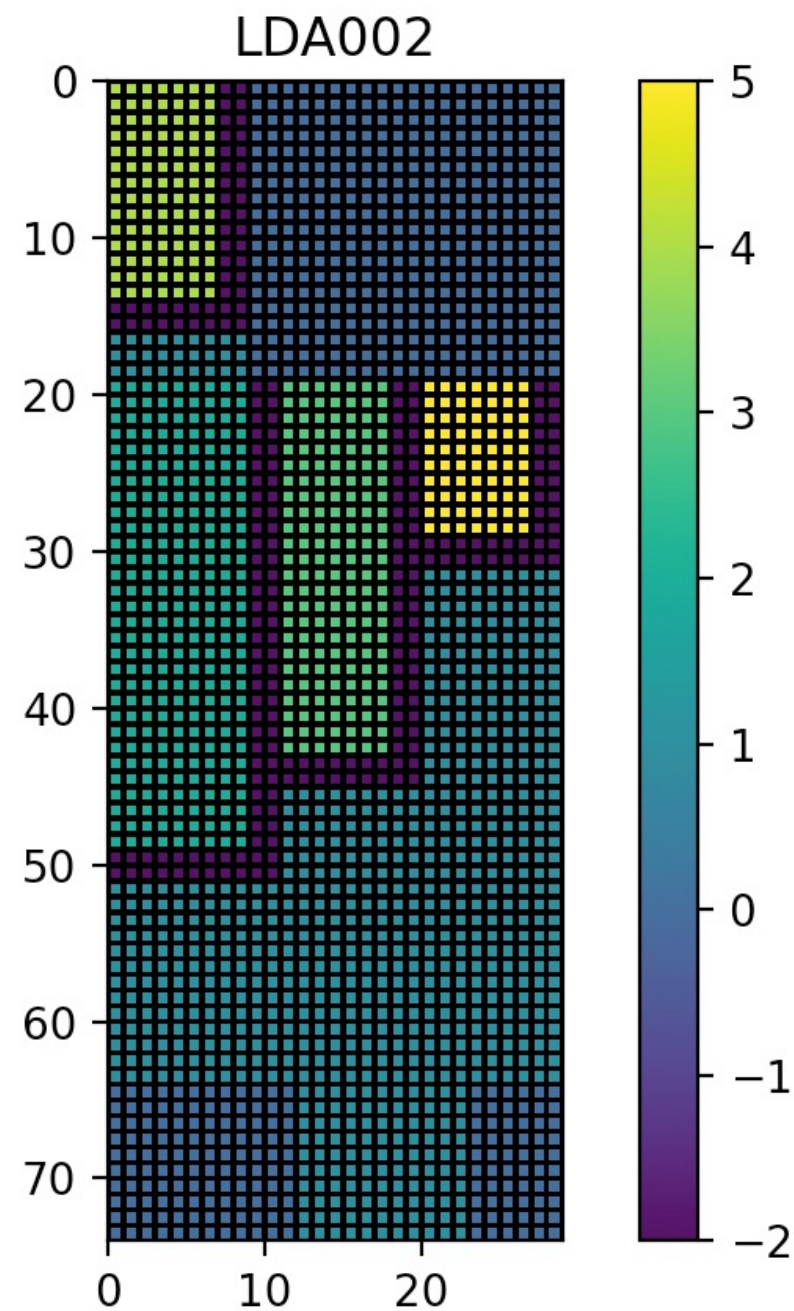
LDA002



LDA002 [ACE3771, ACE3769, ACE3770]  
 Weight remaining: 4600.0  
 ACE3771 30 9 Moon Pool  
 ACE3769 24 7 Moon Pool  
 ACE3770 14 7 Moon Pool

# Phase 3

- Access Space



LDA002 [ACE3771, ACE3769, ACE3770, ACE3762]  
Weight remaining: 168.0  
ACE3771 30 9 Moon Pool  
ACE3769 24 7 Moon Pool  
ACE3770 14 7 Moon Pool  
ACE3762 10 7 South East Corner

# Phase 4 and 5

- Locations and Risk & Hazards

1	Location	LDA ID	Item ID	Desired location	LDA takes hazards	Cargo hazards	LDA takes risk	Cargo risk
2	North Side	LDA010	ACE 3566	North Side	1	1	1	1
3	North Side	LDA010	ACE2083	North Side	1	1	1	0
4	North Side	LDA011	ACE2167CS	Moon Pool - Main Deck	0	0	1	0
5	North Side	LDA005	UM680	North Side	0	0	1	1
6	North Side	LDA018	ACE3640	North Side	0	0	1	0
7	North Side	LDA018	ACE3746	Pontoon	0	0	1	1
8	North Side	LDA009	ACE1799	North Side	1	0	0	0
9	North Side	LDA009	ACE2166CS	Moon Pool - Main Deck	1	1	0	0
10	North Side	LDA013	ACE3726	North Side	1	0	0	0
11	North Side	LDA013	UM677	North Side	1	0	0	0
12	North Side	LDA017	IC3640	North Side	0	0	0	0
13	North Side	LDA017	ACE3737	Pontoon	0	0	0	0
14	Moon Pool - Main Deck	LDA002	ACE3766	Moon Pool - Main Deck	0	0	1	1
15	Moon Pool - Main Deck	LDA002	ACE1693	Moon Pool - Main Deck	0	0	1	0
16	Moon Pool - Main Deck	LDA002	ACE1713	Moon Pool - Main Deck	0	0	1	0
17	Moon Pool - Main Deck	LDA002	ACE2166	Moon Pool - Main Deck	0	0	1	0
18	Moon Pool - Main Deck	LDA002	UM563	Moon Pool - Main Deck	0	0	1	0
19	Moon Pool - Main Deck	LDA002	UM365	North Side	0	0	1	0
20	Moon Pool - Main Deck	LDA002	UM678	South East Corner	0	0	1	0
21	South East Corner	LDA012	IC3641	South East Corner	1	0	1	1
22	South East Corner	LDA012	ACE1748	South East Corner	1	0	1	0
23	South East Corner	LDA015	ACE3759	South East Corner	1	0	1	1
24	South East Corner	LDA015	ACE2089	South East Corner	1	0	1	0
25	South East Corner	LDA015	ACE3741	Pontoon	1	1	1	0
26	South East Corner	LDA004	ACE3758	South East Corner	0	0	0	0
27	South East Corner	LDA004	ACE3667	South East Corner	0	0	0	0

DEMO

# Result/achievements

- Optimal result:
  - fewest remaining cargos
- Output:
  - placement of optimal result

1	CargoList sorted	LDAList sorted	Remaining cargos
2	Unsorted	Unsorted	22
3	Unsorted	Smallest	20
4	Unsorted	Biggest	20
5	Unsorted	Risk and Hazards	21
6	Area	Unsorted	20
7	Area	Smallest	18
8	Area	Biggest	20
9	Area	Risk and Hazards	19
10	Weight	Unsorted	18
11	Weight	Smallest	10
12	Weight	Biggest	10
13	Weight	Risk and Hazards	10
14	Location	Unsorted	18
15	Location	Smallest	10
16	Location	Biggest	10
17	Location	Risk and Hazards	10
18	Risk and Hazards	Unsorted	10
19	Risk and Hazards	Smallest	8
20	Risk and Hazards	Biggest	13
21	Risk and Hazards	Risk and Hazards	8



1	Location	LDA ID	Item ID	Coordinates	Rotation	Length (mm)	Width (mm)	Weight (kg)	Load date
2	North Side	LDA010	ACE3566	0.0,0.0	USANN	4877	2438	6395	02.01.21
3	North Side	LDA010	ACE2083	6.0,0.0	SANN	1800	870	1850	02.01.21
4	North Side	LDA011	ACE2167CS	0.0,0.0	USANN	500	400	120	02.01.21
5	North Side	LDA005	UM680	0.0,0.0	USANN	1700	1700	340	02.01.21
6	North Side	LDA018	ACE3640	3.5,0.0	SANN	8620	2885	46000	02.01.21
7	North Side	LDA018	ACE3746	0.0,9.5	USANN	1326	667	1250	02.01.21
8	North Side	LDA009	ACE1799	0.0,0.0	USANN	2500	1330	3500	02.01.21
9	North Side	LDA009	ACE2166CS	0.0,2.5	USANN	500	400	120	02.01.21
10	North Side	LDA013	ACE3726	0.0,0.0	USANN	4814	1410	10948	02.01.21
11	North Side	LDA013	UM677	6.0,0.0	USANN	1700	1700	340	02.01.21
12	North Side	LDA017	IC3640	0.0,0.0	USANN	1700	1700	340	02.01.21
13	North Side	LDA017	ACE3737	3.0,0.0	SANN	1326	667	1250	02.01.21
14	Moon Pool - Main Deck	LDA002	ACE3766	0.0,0.0	USANN	14222	2506	7861	07.01.20
15	Moon Pool - Main Deck	LDA002	ACE1693	9.5,4.0	USANN	2904	2404	30000	02.01.21
16	Moon Pool - Main Deck	LDA002	ACE1713	9.5,7.5	USANN	4250	2708	6000	02.01.21
17	Moon Pool - Main Deck	LDA002	ACE2166	9.5,11.5	USANN	3000	1345	4500	02.01.21
18	Moon Pool - Main Deck	LDA002	UM563	13.5,4.0	USANN	1230	1230	300	02.01.21
19	Moon Pool - Main Deck	LDA002	UM365	13.5,11.5	USANN	1230	1230	300	02.01.21
20	Moon Pool - Main Deck	LDA002	UM678	15.0,6.5	USANN	1230	1230	300	02.01.21
21	South East Corner	LDA012	IC3641	0.0,0.0	USANN	1230	1230	300	02.01.21
22	South East Corner	LDA012	ACE1748	0.0,2.5	USANN	1570	1210	4500	02.01.21
23	South East Corner	LDA015	ACE3759	0.0,0.0	USANN	2750	3500	30000	02.01.21
24	South East Corner	LDA015	ACE2089	4.0,0.0	SANN	1800	870	1850	02.01.21
25	South East Corner	LDA015	ACE3741	4.0,3.0	SANN	1326	667	1250	02.01.21

# Further improvements

- Prioritize location for cargo placement
- Load and dispatch dates
  - Simulations
- Change Access space to client's preference

# Refinement of Deck Management COG

- Search in Cargo List
- Dates
- Isolate Floor
- Deck View
- Orthographic Views

# Search In Cargo List

New Project - Deck management

Search

Unassigned Cargo

Tag	Size (m)	Weight (kg)	Comm
ACE3761	4.89 / 3.86 / 0.33	4,659.0	definit
ACE3761	4.89 / 3.14 / 0.33	4,432.0	definit
ACE3761	0.73 / 0.07 / 1.20	350.0	definit
ACE3765	14.22 / 2.51 / 0.38	7,861.0	definit
ACE3766	14.22 / 2.51 / 0.38	7,861.0	definit
ACE3727	8.20 / 3.50 / 1.89	7,495.0	definit
ACE3727	8.20 / 3.50 / 0.64	7,020.0	definit
ACE3727	4.89 / 3.86 / 0.33	4,659.0	definit

Existing Cargo

LD Area	Tag	Start date	End date	Description
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h

Go To

In 3D Model (245771)

Well Paths

DH

HU

HBG-4185/TT-41852\_N13

HBG-4185/PG-41851A\_N10

Show All (245771 found)

In 3D Model - Parent Only (10559) Go To

HBG-3230017

HCC-3230001

HHP-3230002

HHP-3230007

HS-61560102B

ZZZ-3230000

ZZZ-3230000

ZZZ-3230000

ZZZ-3230000

DV-61560102

Show All (10559 found)

In P&ID (10872) Go To

VS-42300150A

4"-DH-4310647-W01X-

3"-VH-5010264-B01F-

HS-42300150B

1/2"-DH-8151086-K01T-

GM004-PR-PID-010-00119-001 (Z01).pdf[0]

GM004-PR-PID-010-00119-001 (Z01).pdf[0]

GM004-PR-PID-010-00119-001 (Z01).pdf[0]

GM004-PR-PID-010-00119-001 (Z01).pdf[0]

GM004-PR-PID-226-10001-002 (Z01).pdf[1]

Show All (10872 found)

In CTDB (113456) Go To

VH-RN-874002A

VH-RN-874002B

HSDM-39203001

HSDM-39203501

HSDM-39203004

Name

Name

Name

Name

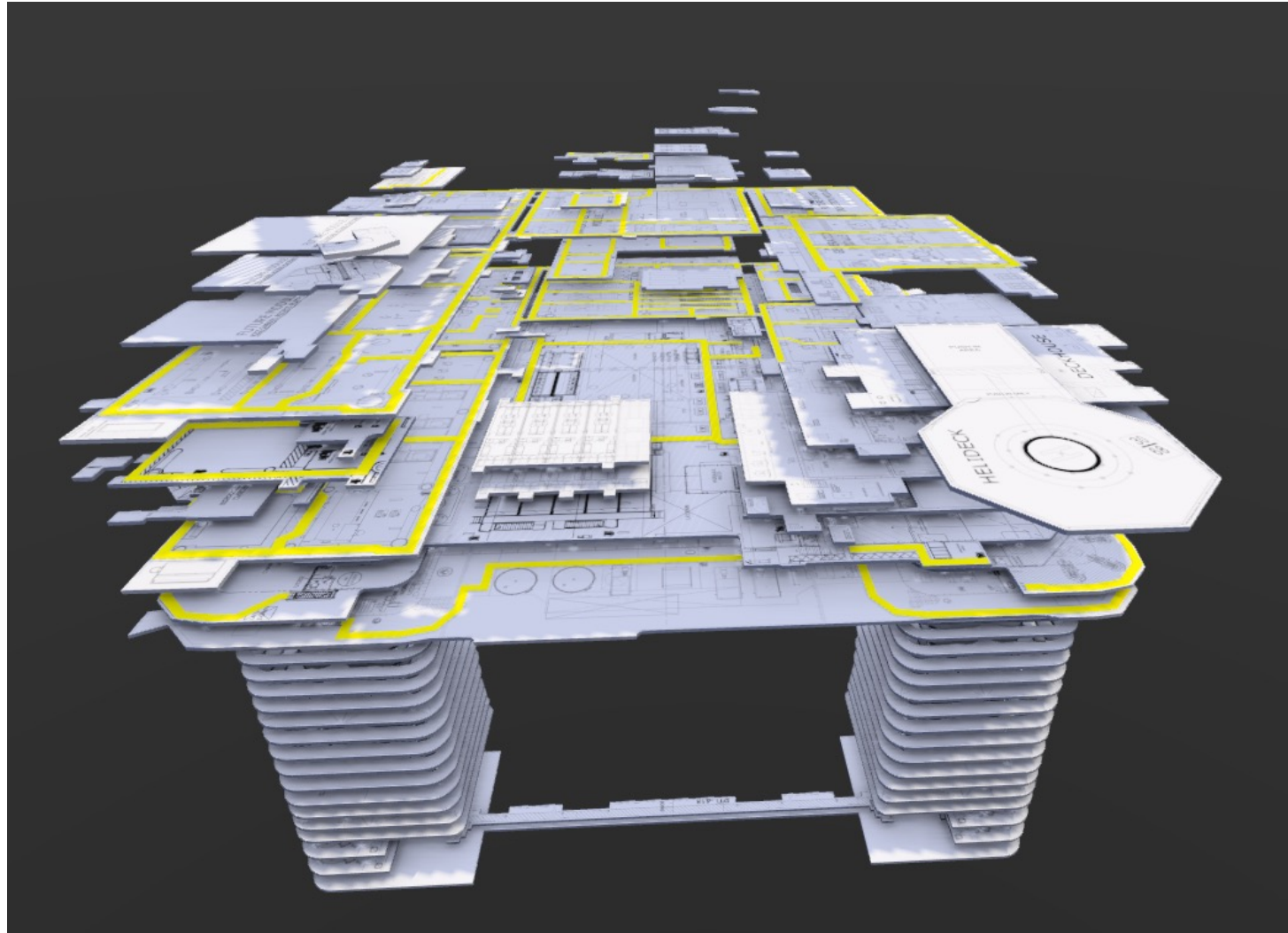
Name

Show All (113456 found)

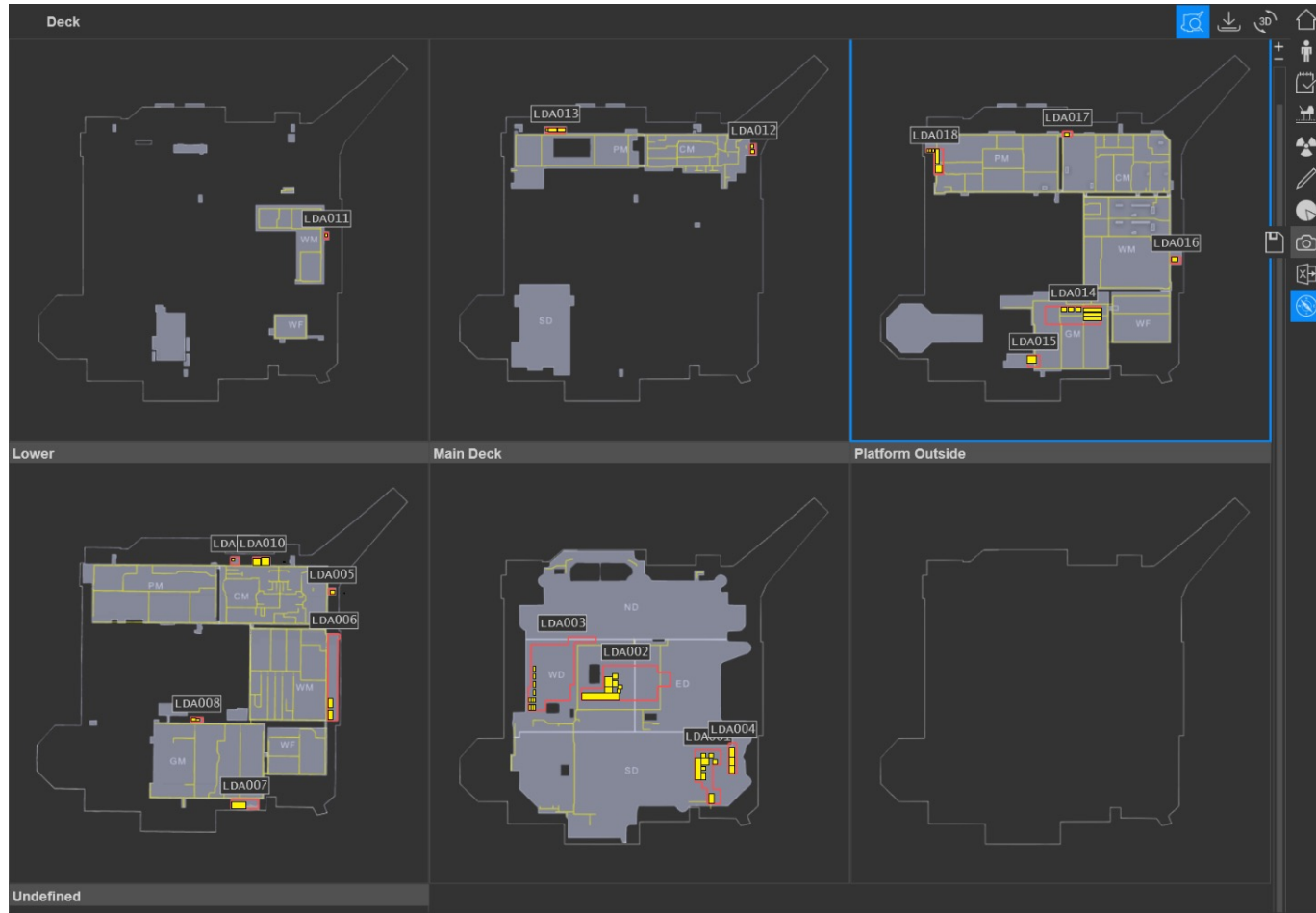
# Changing Dates

Existing Cargo				
LD Area	Tag	Start date	End date	Description
LDA011	ACE3727	07/01/2020	07/08/2020	

# Isolate Floor



# Cargo in Deck View





# Orthographic Views

