

## 1. INFRA & EQUIPMENT

### 1.1 Asset Health Monitoring & Predictive Maintenance

- CMS scope usually consists of vibration analysis, and lube oil analysis to predict the failure or proactively work to avoid failure.
- **Wireless Vibration Monitoring System** that integrates other parameters such as **temperature, current, RPM and speed** into a single diagnosis system.
- CMS provides us a system to catch the potential failures well ahead of time to avoid breakdowns.

#### Asset Health monitoring application areas in VPT

1. Pumps
2. Electric motors
3. Other high / low voltage equipment
4. Floating Crafts
5. Locomotives
6. Bridges & civil structures
7. Railway tracks & infrastructure

#### • IoT Based Smart Drain Monitoring System with Alert Messages

- It is difficult to track drains manually, when they are clogged and the whole region is filled with water.
- A warning system that sends the sensed data to the authorities using GSM techniques and IOT.
- MQ135 is to be used for sewage gas, an ultrasonic sensor for sewage distance, and a water level sensor to keep track of water flow.
- If the level reaches a certain threshold, it will send a text message using GSM to the authority to report the issues mentioning which areas should be fixed with a location using GPS

### 1.2 Capex Project Management & Progress Management

- Project management -
- Projects with sub-tasks and deadlines
- Real-time KPI dashboard
- Shared team calendar & meeting scheduling
- Contract management
- Time tracking and billing for work
- Detailed reports on project progress and finances
- Quoting and invoicing with pre-set templates

## 2. CARGO MANAGEMENT

### 2.1 Online booking system to improve storage capacity utilization

- Need to map land information into software
- Create map ids along with details of plot in software
- Display the status of plots with different color coding in GIS based software with dynamic updates by using sensors for occupancy
- Provision for the stakeholder to select the required plot from the software and also integrate the software with SAP for updating billing information without manual intervention
- Provision for obtaining MIS and BI reports from Software
- 100% Cargo scanning to enhance yard integrity.
- To identify the radio active elements and other dangerous explosives

## 2.2 Smart Quay Walls

### Smart Quay Wall offers :

- Ship to maritime structure (quay wall) interaction
- Ship to soil interaction
- Soil to maritime structure (quay wall) interaction
- Maritime structure to client operations interaction

### Smart Quay Wall advantages:

- **More quay capacity** – The sensors reveal hidden capacities to improve the usage of the quays.
- **Lower maintenance costs** – sensors show more precisely where and when maintenance is required. More efficient maintenance also reduces hindrance and downtime of quays.
- **Innovation of quay walls** – sensors provide data during design, construction, management / maintenance / use and eventually demolition.

## 2.3 Smart Buoys to aid ship navigation

- **Smart Buoy - more than a Navigational Aid**
- The key idea of the smart buoy concept is to utilize the current marine buoy infrastructure so that buoys can be integrated with measuring instruments to produce data.
- Smart buoys have been utilized for Real-time measurements of marine water monitoring:
  - water quality measurements,
  - dredging,
  - turbidity measurements
  - salinity,
  - temperature and
  - oxygen content measurements.

### **3. Traffic Flow Management**

#### **3.1 Computer Vision/OCR driven gate operations – waiting time optimization**

- Its part of RFID gate management.
- The RFID has become obsolete and OCR become the standard
- Analytics can be made on the captured data
- For rail freight infrastructure, OCR (Optical Character Recognition) at entrances and exits is the more reliable and cost-effective solution.

#### **3.2 Virtual Booking System for seamless ship management**

- Online berth management system module in POS to allocate the berth as per the request of stake holders on transparent manner as per the berthing policy of VPT.
- Priority based berthing.
- Seniority based berthing

#### **3.3 Next-Gen Vessel Traffic Management System (VTMS)**

##### **VTMS Features:**

- Automatic recording of ship visit data
- Automatic recording of ship position in the System area
- Search for information by the set criterion
- Provision of information on the ship calls to other services
- Automated electronic Log Book
- Use of database information to identify acquired radar targets
- Generation of Vessel Positioning report for a specific moment in time

### **4. Customs & Other stake holders**

#### **4.2 e-DO for process streamlining**

##### **e-DO Electronic Delivery Order was implemented at VPT**

- The PCS 1x platform offers all e-DO related activities including e-invoice and e-payments, with highly secure data interchange between requester and provider.
- With the roll-out of the service, trade and industry will be further facilitated and save time and money in clearing cargo, speed up Delivery Order extension and the Empty offload process.

- Stakeholders can request invoice, view invoice, make payment and secure e-DO on PCS1x

#### **4.3 Document e Verification via virtual data repository**

### **5. Collections & Financials**

#### **5.1 Electronic Financial Receipt(e-FR) for all transactions**

- Provision for doing online transactions from all net banking facility on 24 \* 7 basis
- Provision for improving the IT infrastructure to mitigate the failure of online transactions
- Provision for obtaining e receipts against the transactions done by stakeholders of VPT
- Provision for generation of MIS reports through online portal and also obtain fortnight reports through front end portal

Ex:PCS 1x System, POS application

#### **5.2 Automated Virtual Tariff Calculation System to aid Decision making**

- Create provision for latest tariff calculation system as per the approval given by Tariff authority in online portal of POS as well as VPT website

#### **5.3 Single Window System for automated online payment enablement**

Provision for single window system for the automatic clearance of vessel by verifying the all necessary documents instead of multiple verifications of the documents through online application portal

- Provision for single window system for automatic generating final bills of the services of VPT through customized application
- Set up a single window system for administrative clearance for stake holders of VPT in all aspects by following the policy guidelines
- Ex: PCS1x, POS application, AI based chatbot etc.,

### **6. Safety & Security**

#### **6.1 Digital Incident Management System(DMIS) for Emergency Response**

- Incident Manager - automates planning, staffing and scaling of the resources required to implement the emergency plan, routing the required information or communications to the incident command system and service management teams.

#### **Incident Management Software features:**

- Quickly send a message to a set of recipients by Text Message, Email, or a text to speech phone call.
- Manually add definable log events that are perfect for recording when power was restored, decision points, notifications of situational changes, problems encountered, or any other trackable relevant information.
- Detailed Reports, Incident Activation Callout Report – which give full situational awareness into who was called and who responded.

## **6.2 Automated Underwater Keel Clearance(UKC) System(DC)**

- UKC is equal to the minimum total water depth at the location of the ship minus the maximum dynamic draft of the ship.
- Dynamic Under Keel Clearance Management Systems use sophisticated models and real-time met-ocean inputs to produce vessel-specific services (e.g. tidal windows, routes, no-go and almost no-go areas) to ensure minimum under keel clearances are maintained.
- Using an advanced UKCM system will reduce chances of running aground.