TRANSMISSION TOWER INSPECTION SOFTWARE SOLUTION

PDRL

Creating More time to LIVE!

Passenger Drone Research Private Limited

PROBLEM STATEMENT FOR TRANSMISSION COMPANIES IN TOWER INSPECTION

Manual Process: Automation and technology has not penetrated the O&M industry and O&M team relies heavily on manual processes and involves human risk and data errors.

Cost: Loss of efficiency, increase in down times leading to inconsistent outputs.

Financials: In many cases, losses are caused due to untimely maintenance which may cause higher losses of inconsistent supply which may be prevented by periodic inspection and timely fixing.

Maintenance: Human involvement in the data acquisition is time consuming and often causes issues with fixing of problems that could have been mitigated with more efficient systems.

Outdated SOPs of monkey patrolling increase risk of human life and adapting better technologies is imperative.

MAJOR PROBLEM STATEMENT

- Repairing cost of corrosion of one Transmission tower can be in thousands of dollars/lacs of rupees

- Timely understanding of corrosion situation and its timely maintenance can save huge amount of revenue per tower.

- Cost of Inspection is another a major cost and therefore low cost, convenient solution is required for timely inspection of transmission towers to save further repairing cost.

TRANSMISSION TOWERS UNDER STRESS

Electrical transmission towers are expected to operate in terrains that often face harsh weather. While the galvanized steel of towers in rural or desert locations can last up to 50 years, salty coastal air or heavy industrial environments can cause a transmission tower to accelerate through the corrosion phases that lead to failure in as little as 15 years.[5]

Steel transmisson towers in **rural or desert environments** last:

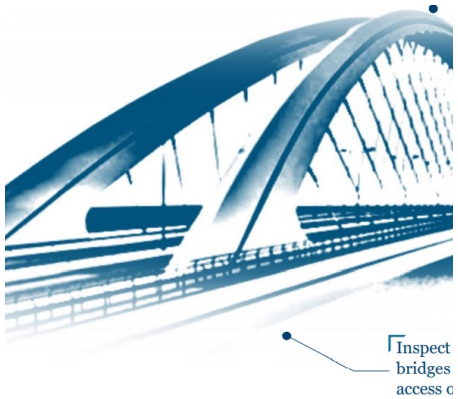
50 yrs

Steel transmission towers in **coastal or industrial environments** last:

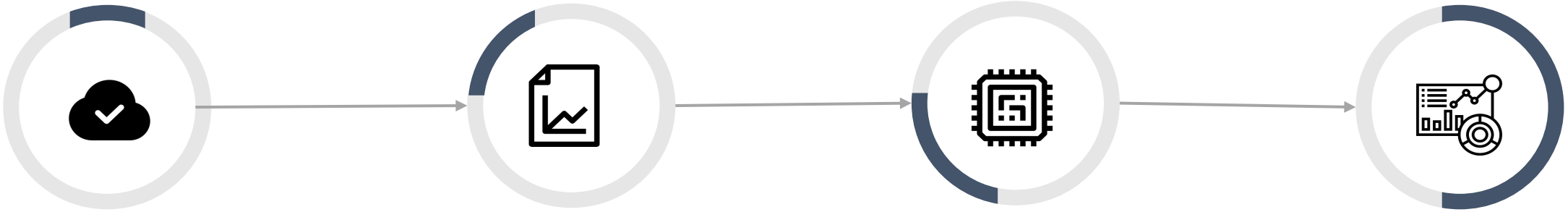
15 yrs

Source: Transmission Tower Maintenance | Utility Products

Proposed Solutions for Transmission Tower Inspection and Monitoring with “**AeroMegh**” Platform



PROPOSED SOLUTION – DATA OVERVIEW



CLOUD CONNECTIVITY

Recent Projects: All the captured data will be available in cloud platform so that it can be accessed by authorized user anywhere anytime. Auto data upload while capturing to have tamper proof data records.

ARTIFICIAL INTELLIGENCE

AI for All: All types of defect analysis is done using our AI/ML systems like, number of screws missing, loose bolts, rusting, conductor issues and so on. Near to real time processing of images and better accuracy.

AUTOMATED REPORT GENERATION

Exhaustive Report: In this report, you will see overall defect summary generated from automated inspection using AI and ML technology.

Graphical reports : You can see report of each individual tower and respective defects of each tower.

INTUITIVE DASHBOARD

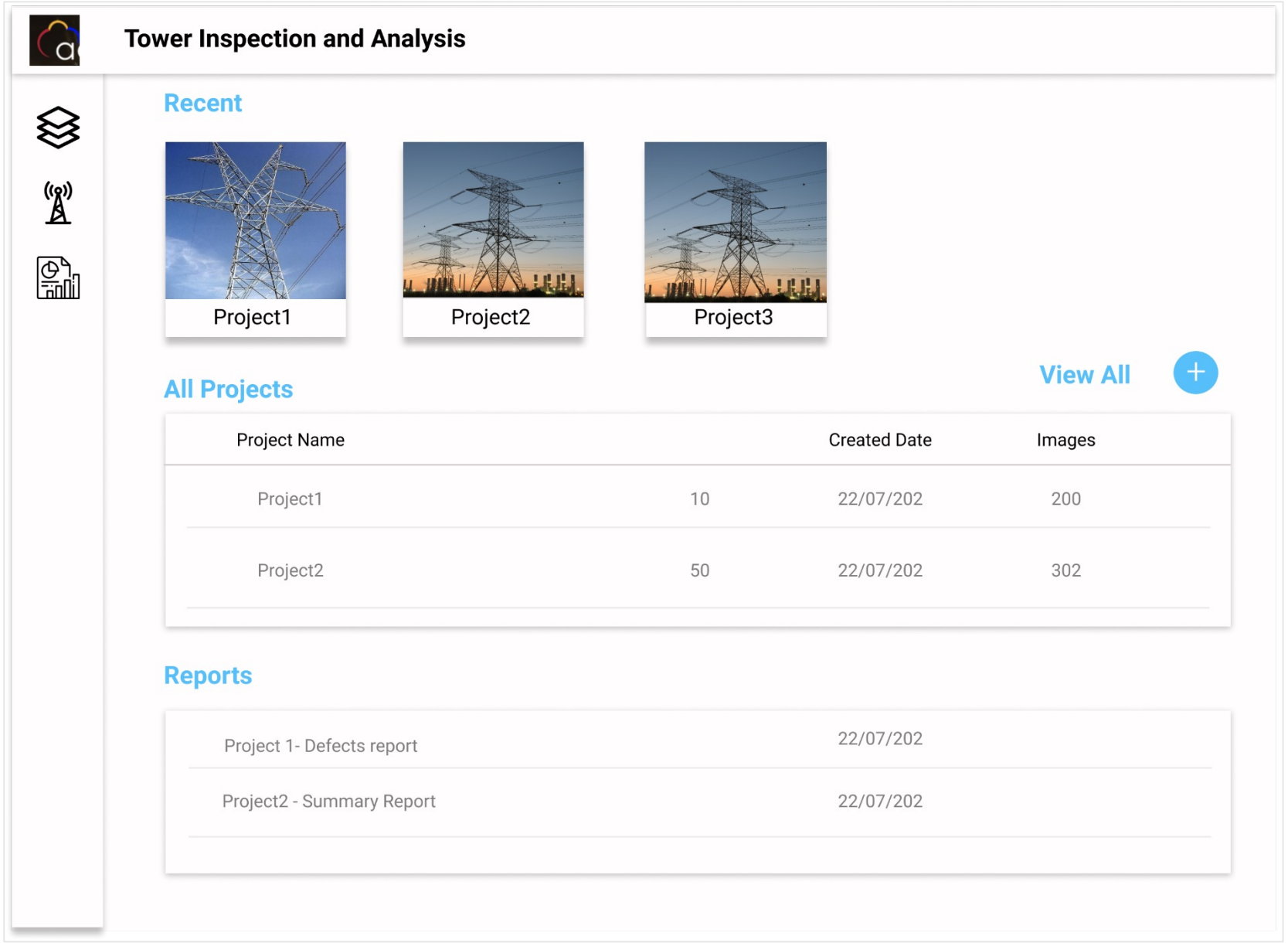
Recent Projects: The dashboard will show all recent project created.

Graphical reports : There will be graphical reports to summarize various parameters in a manner to deduce effective actions.

PROPOSED SOLUTION – DASHBOARD OF TOWER INSPECTION

Dashboard:

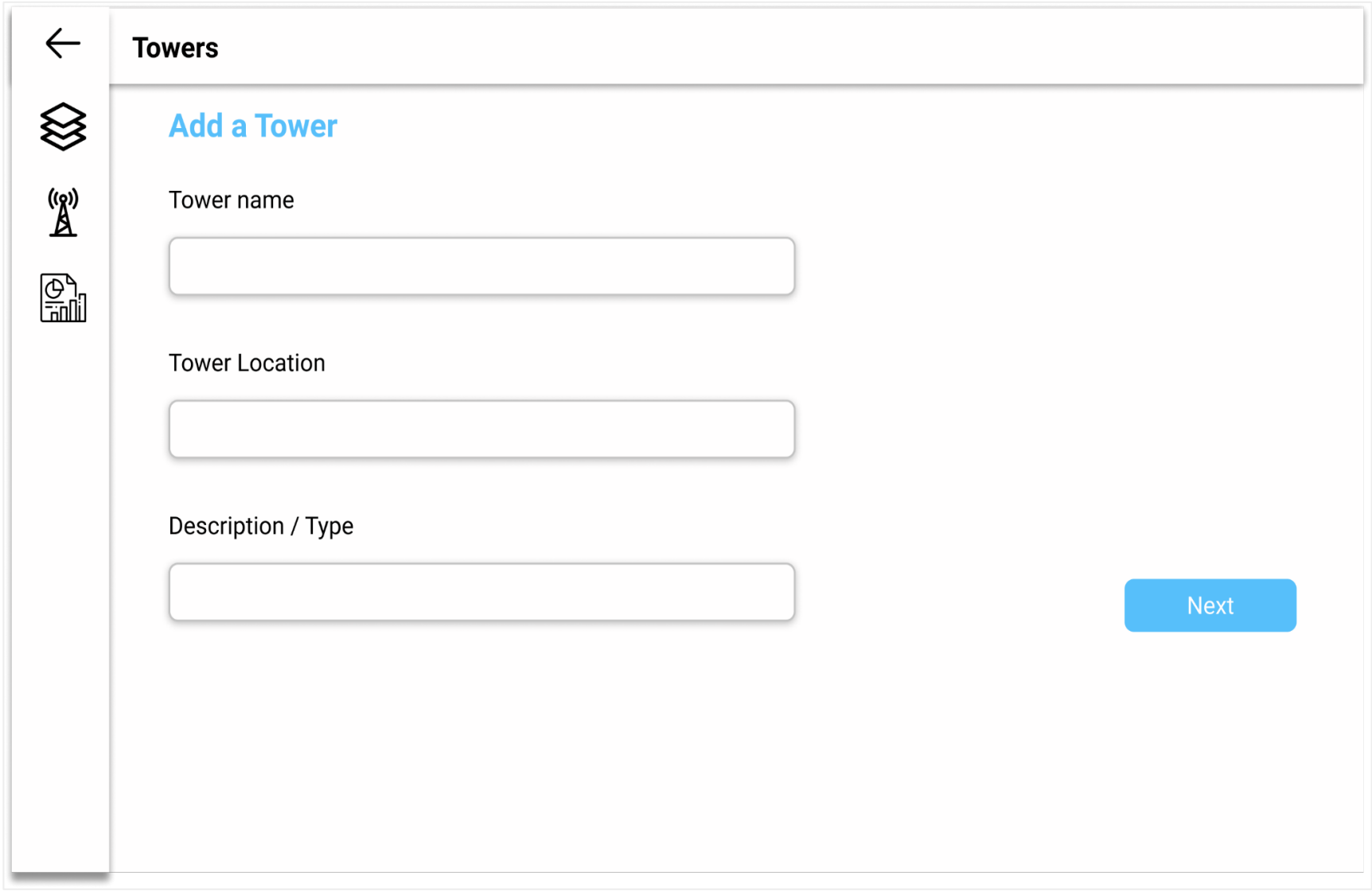
- **Recent Projects**→ The dashboard will show all recent project created with newer one first.
- **All Projects** → All Projects will showcase all created project with search reports well.
- **New Project** → There will be option to create a new project from dashboard itself.
- **Graphical reports** → There will be graphical reports to summarize various parameters in short.



PROPOSED SOLUTION – ADD TOWER TO INSPECT

Add Tower

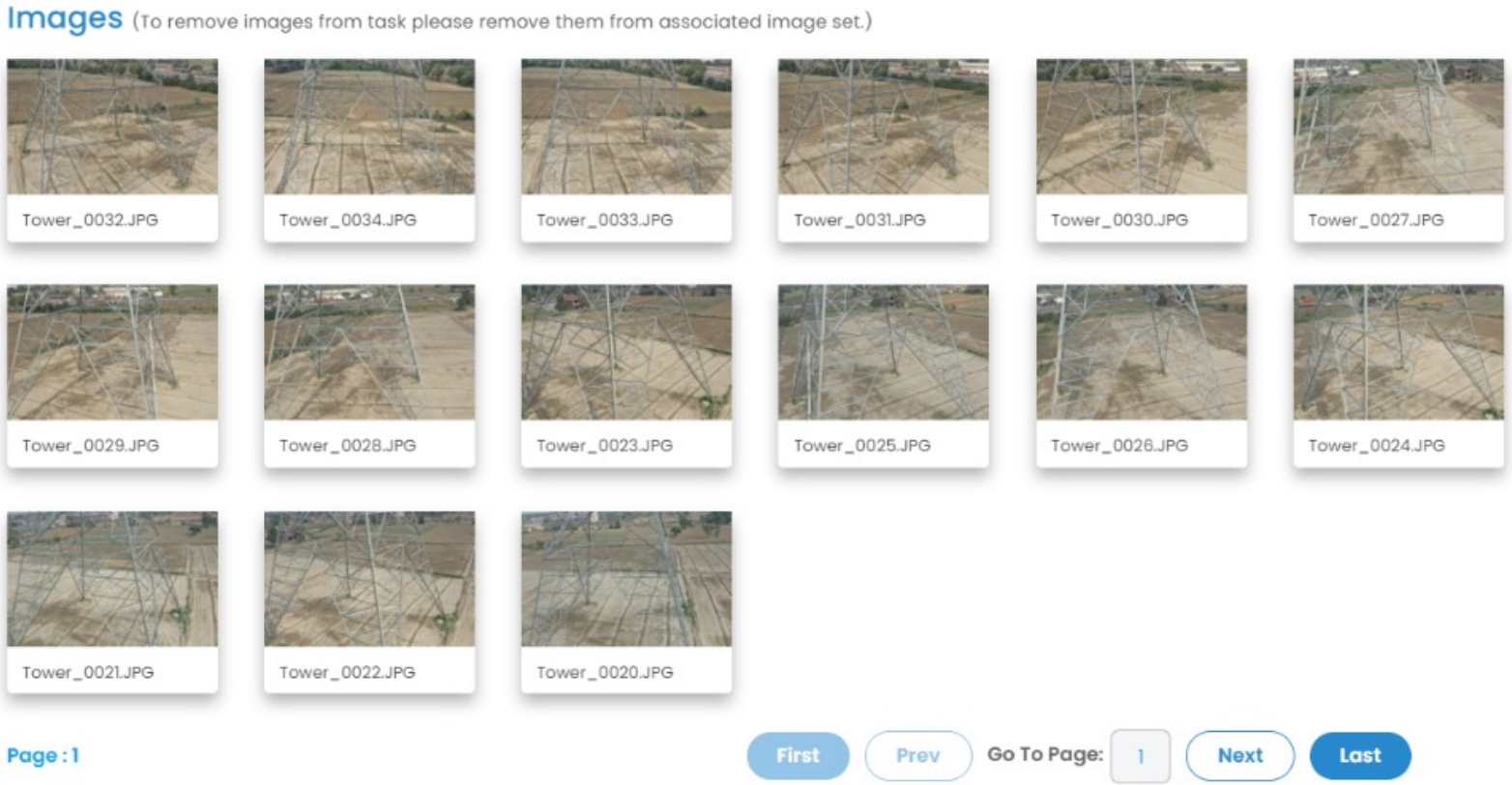
- **Tower Name** → You can define tower name when you add a tower to inspect. Name can be as per your convenance to remember.
- **Tower Location** → Tower location can be entered as location including the map of the tower. It will help to map it on geo-map.
- **Description / Type** → There can be various types of towers. You can define type of the tower to classify it and track it.



PROPOSED SOLUTION – ADD IMAGES TO DETECT DEFECTS

Add Images

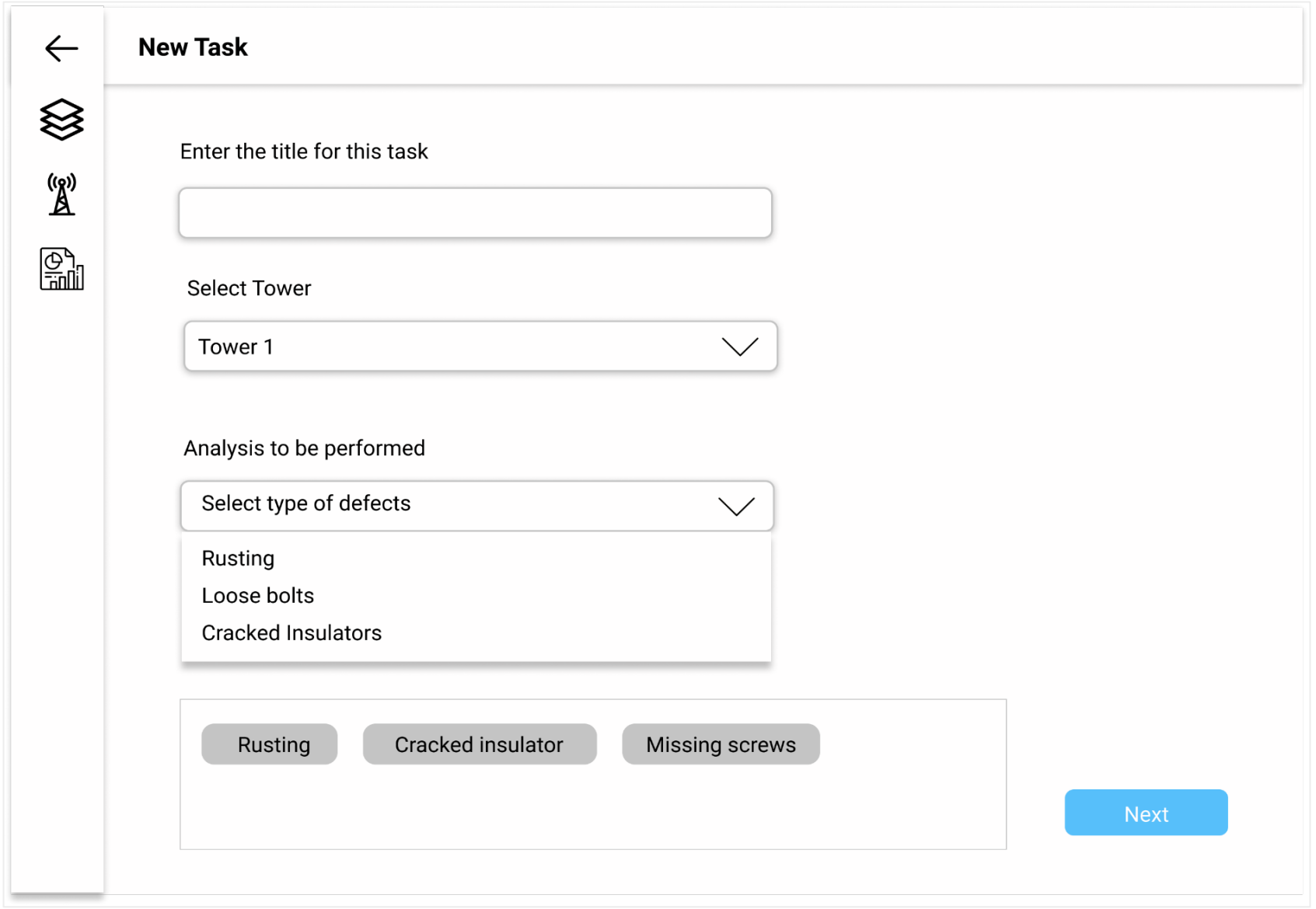
- **Add Images** → You can add all images which are required to be scanned from this screen. All images should be available on local disk and then you can select them to import. There will certain limit to number of images can be added in one go. So there are so many images, then it may require to be added in multiple times.
- All the images added will be shown here itself so see total images got added with other details.



PROPOSED SOLUTION – DETECTION ANALYSIS TASKS

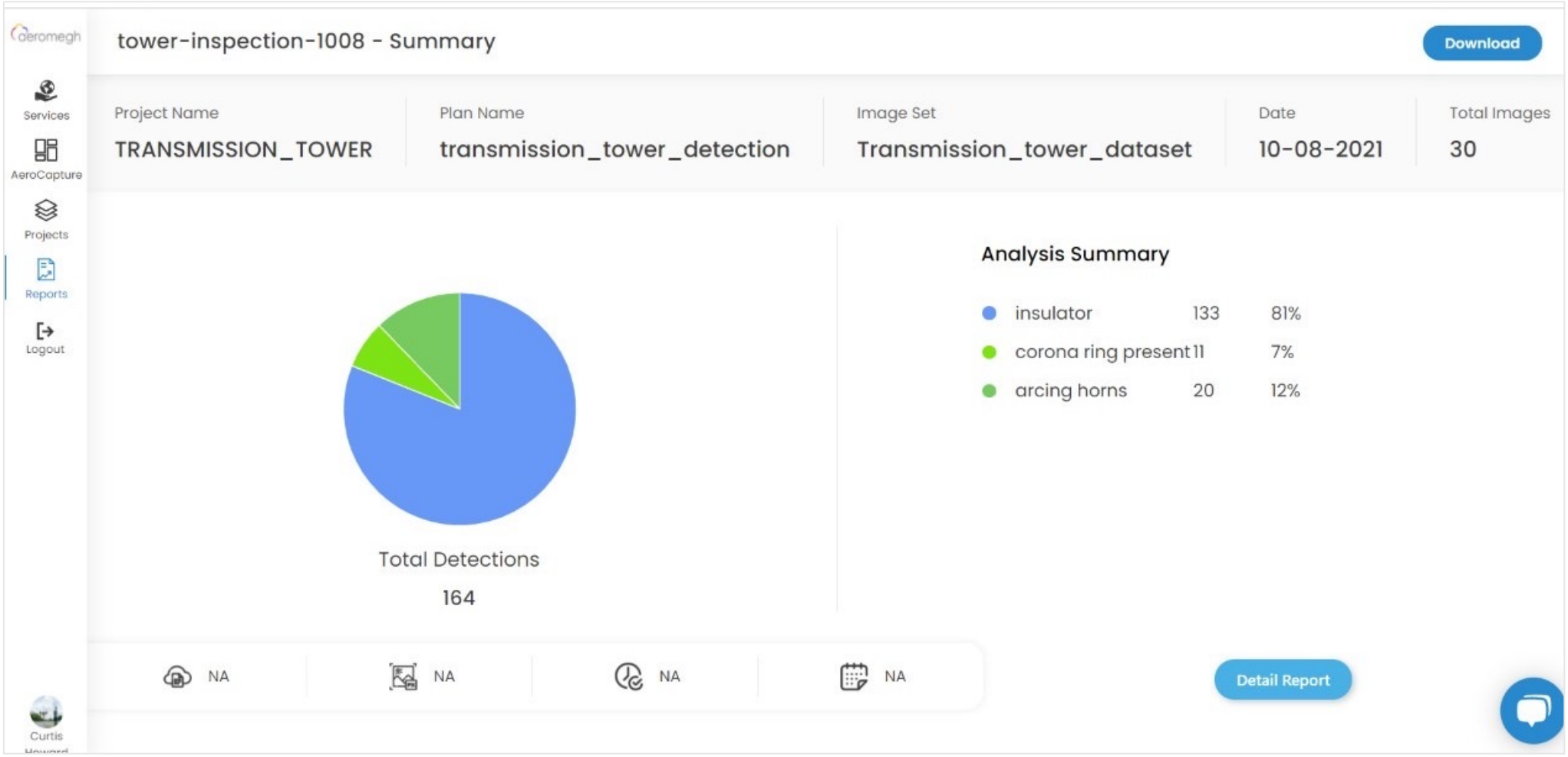
New Detection Task

- **Task Details** → Enter details of Tasks here.
- **Tower Name** → Select the tower on which you want to run the inspection report. Tower should have been added into the system to choose it from drop down.
- **Analysis** → Once tower is selected then you need choose what kind of analysis is required for this selected tower. Analysis can be various types like nut bolt checking, rusting, cracks finding and so on. Multiple analysis can be done on one tower.



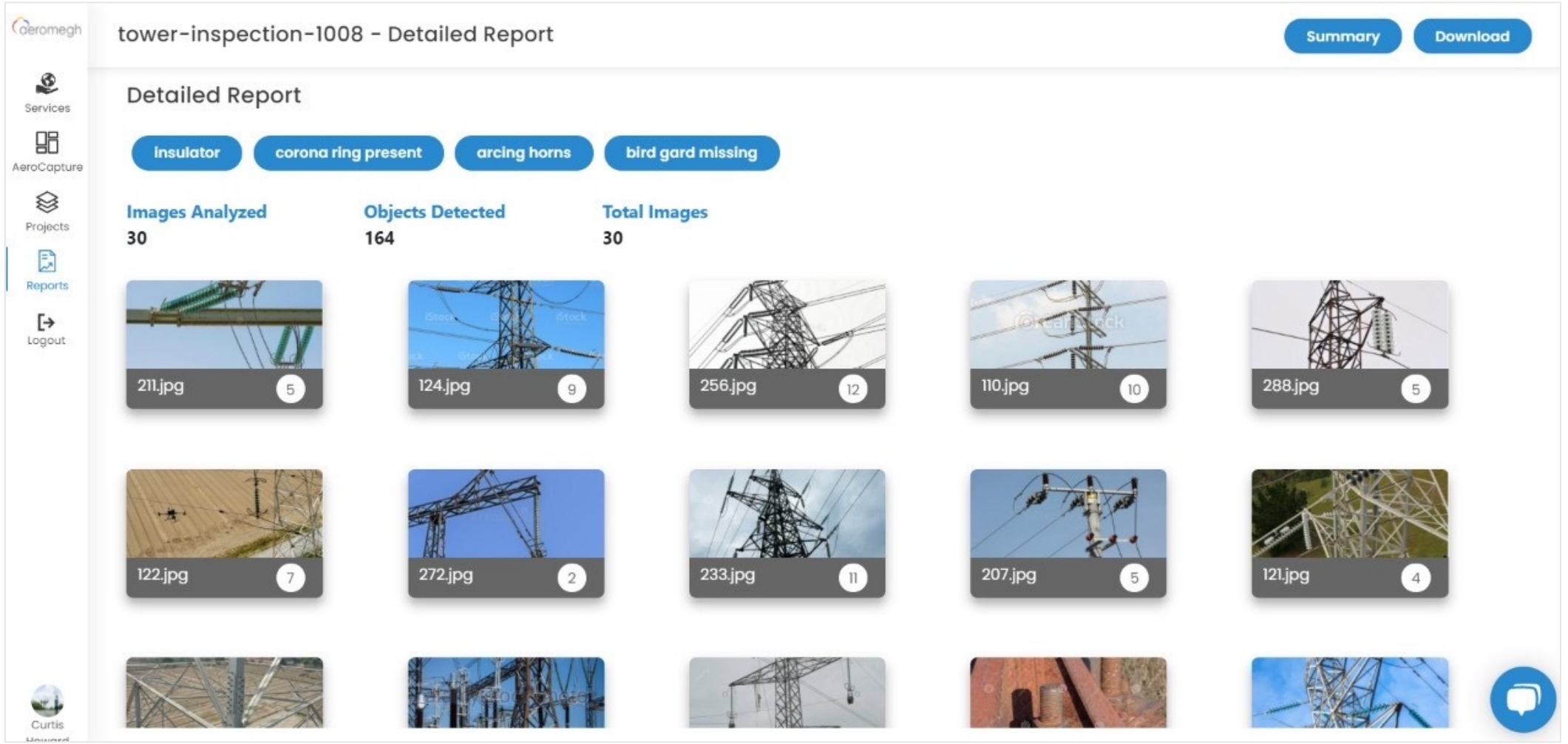
PROPOSED SOLUTION – SUMMARY REPORT

Overall Defect Summary Report→ In this report, you will see overall defect summary generated from automated inspection using AI and ML technology. You can see report of each individual tower and respective defects of each tower. You can click on any individual tower report and then enter into the details of that particular tower for details of insights.



PROPOSED SOLUTION – DETAILED REPORT

Defect Detailed Report → The detailed report shows all images of any individual tower inspection plan, all objects detected, and the number of objects detected in each image. See below image.



PROPOSED SOLUTION – DETAILED PDF REPORT

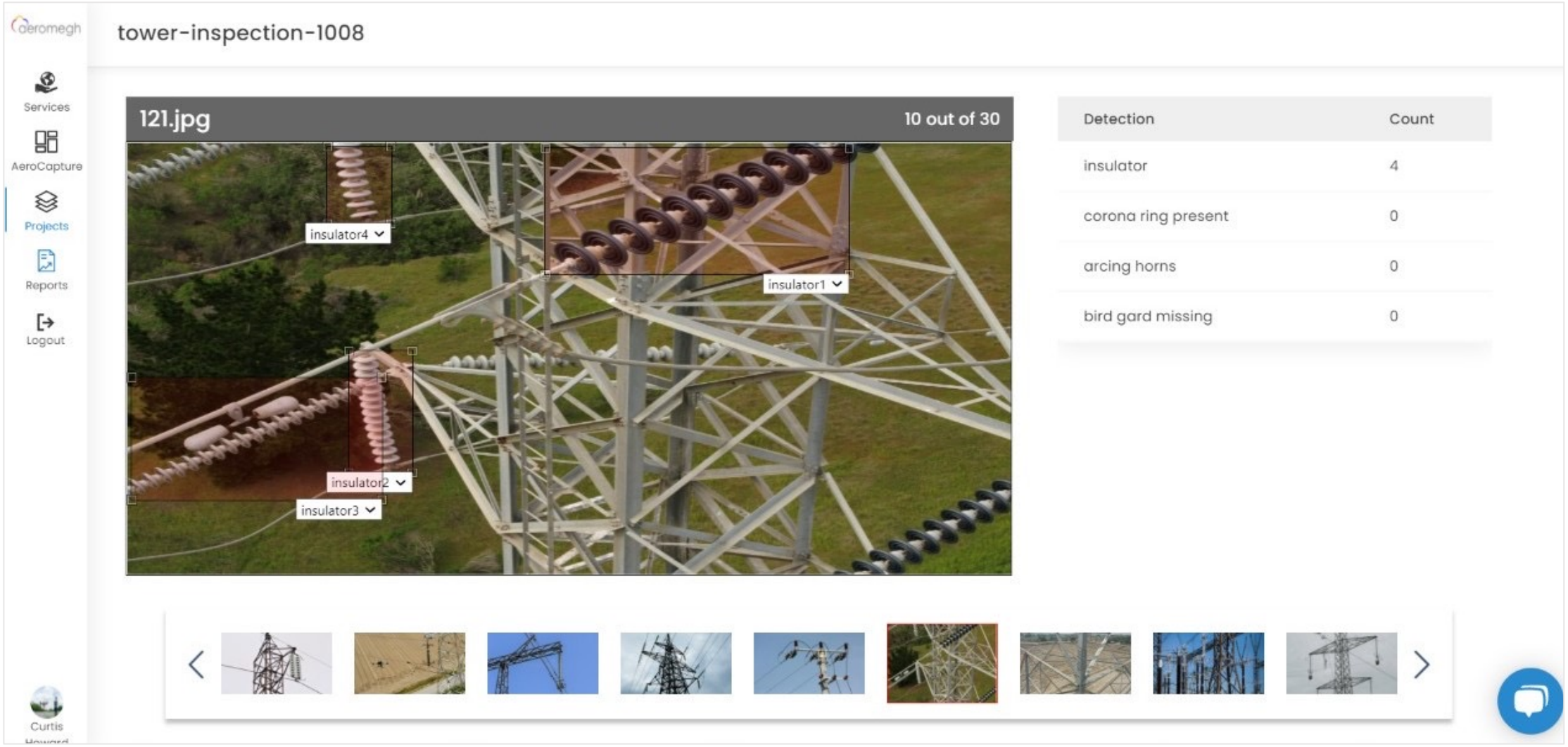
Overall Defect Summary → The detailed report shows each image and objects/defects found each image along with the objects/defect types and their quantity in each image.

Detailed Analysis

Image	Defect	Count	Size
 211.jpg	insulator corona_ring_present	5	-
 124.jpg	insulator corona_ring_present	9	-
 256.jpg	insulator	12	-
 110.jpg	insulator corona_ring_present	10	-
 288.jpg	insulator arcing_horns	5	-
 122.jpg	insulator corona_ring_present arcing_horns	7	-
 272.jpg	insulator corona_ring_present	2	-

PROPOSED SOLUTION – EACH IMAGE REPORT

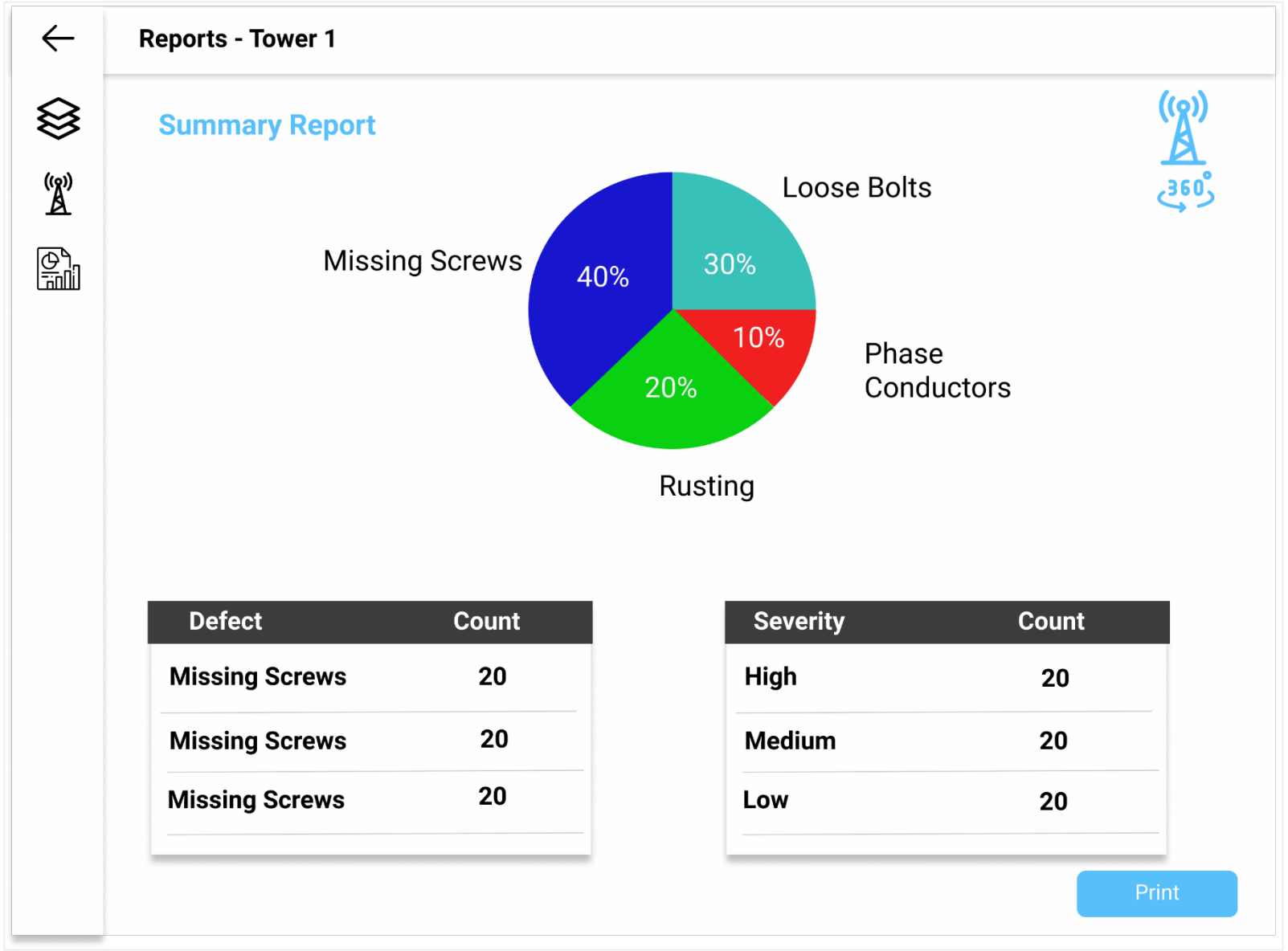
Detailed Report of Each Image → **Detailed object analysis report of each image can be seen along with the actual marking of objects/ defects on each image.**



PROPOSED SOLUTION – SUMMARY WITH 360 VIEW

Tower Report

- **Summary Report** → Summary Report shows overall summary of automated inspection of individual tower. All types of defect analysis is completed and then it found number of screws missing, loose bolts, rusting, conductor issues and so on. Date wise report can be added to how historical data of that particular tower. Print, Export and sharing of reports will be given to share with other stake holders.
- **360 Degree View** → From Summary Page, you can enter into 360 degree view of the tower to zoon in for the tower details.

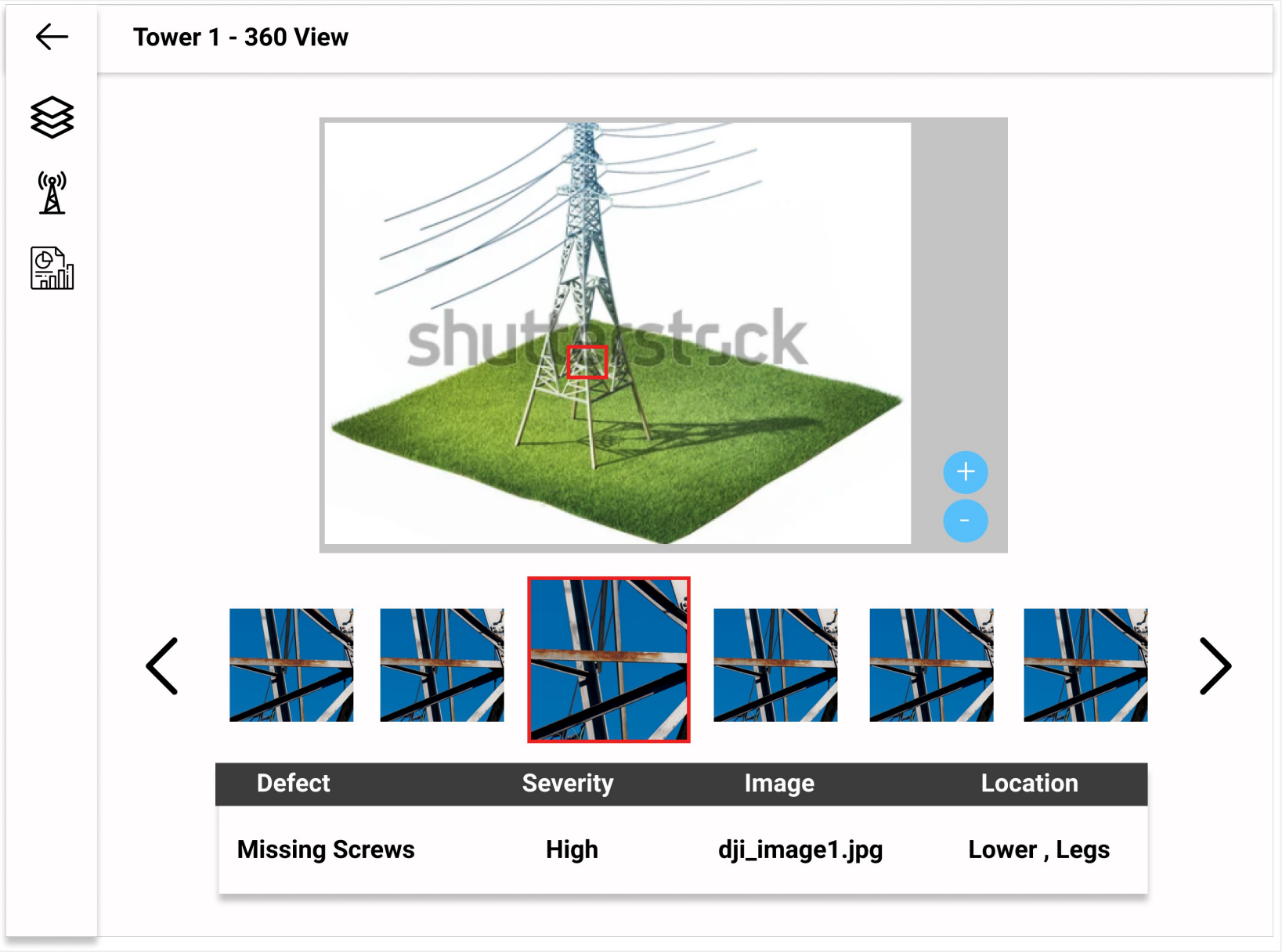


PROPOSED SOLUTION – 360 VIEW OF TOWER (IN PROGRESS)

360 degree view

- **360 degree view** → 360 degree view of individual tower is possible from the tower report section. You can see tower from all views using mouse and also zoom in / zoom out the view of the tower. This empower customer do to inspection of the tower as per his need. Similarly, it empower customer to validate the automated generated reports with manual inspection.

- **Defect Images** → All the images which shows some kind of defect are displayed below the tower. These images are selected from bunch of images with automated process using AI and ML. Information of each selected image will be displayed in below section.



WHY TO USE THE SOLUTION

Reduced Risk
It is also difficult to do manual inspection using trucks or ladder. It is always risk to human life when someone is reaching to take snaps to monitor the condition. By using drone, we reduce the risk to valuable human life.

Improved Efficiency
Utilities may find that they can save time and cost with drone inspections. For example, with a drone, substation inspections can be completed within an hour and no shut-down is required.

Increased Uptime
With more frequent monitoring and maintenance due to lower cost, you an increased uptime of transmission infrastructure.

Increase Customer Satisfaction
Due to lower cost, appropriate maintenance, the uptime of power transmission system increases which certainly gives better customer satisfaction and more revenue.

Fast Response
Drones can also provide invaluable insights after a natural disaster when the terrain conditions may be unknown and fast response times are critical. Using drones allows quicker access to areas that may be blocked by water or fallen trees.

Quick Return on Investment
By using drone, you can get your investment returns faster as you don’t need to do any capital investment to get your work done.

Catastrophic Failures Mitigation
Due to lower cost and frequent maintenance, avoid any kid of catastrophic failure in transmission system and give better uptime to the consumers.

Improve Organization Rating
There are multiple level of compliances either from Government or external agencies. With right monitoring, inspection and corrective actions, the overall compliance becomes easy. This help to improve rating of the power company.

PLATFORM CAPABILITIES

Auto Report Generation

Once detection is done, software will generate report automatically. The reports will be available on dashboard

Panorama View

Panorama view of each Transmission tower will be the biggest feature. Panorama view will be created using images. This will help customers to go 360 view of transmission tower.

Zoom in Defects

Zoom in capability in defect of tower in terms of tower nut bolt mission, corrosion and so on will help customer to find actual defect area and plan corrective action accordingly.

Defect Severity Level

Tower defect Severity Level will give inside and action information to customer so that based on that severity level, he can plan corrective action.

Historical Reports

Historical Reports of tower will be beneficial to customer so that he can understand defects history in any tower and may be history of corrections.

Open Integration

Software will have capability to interface with other system using API Interface. It can be interfaced directly with AeroMegh platform so that all images coming in can be directly scanned to save time.

PLATFORM CAPABILITIES

Multi –Tentant

The TransCapture software will be multi tenant cloud-based application. Multiple customer companies can be created through software and multiple projects of each customers can be there.

Multi – Data Sources

Software will be having multiple sources of data import. Right from local disk to AeroMegh Platform Services (if taken). By default, local disk data import option will be available.

Project Management

Software will be having capabilities of Project Management of tower inspection. Multiple Projects can be created and managed simultaneously.

Machine Learning Models

Software will be having provision of machine learning model importing/ creating. So that all learned models can be imported and used against new defects.

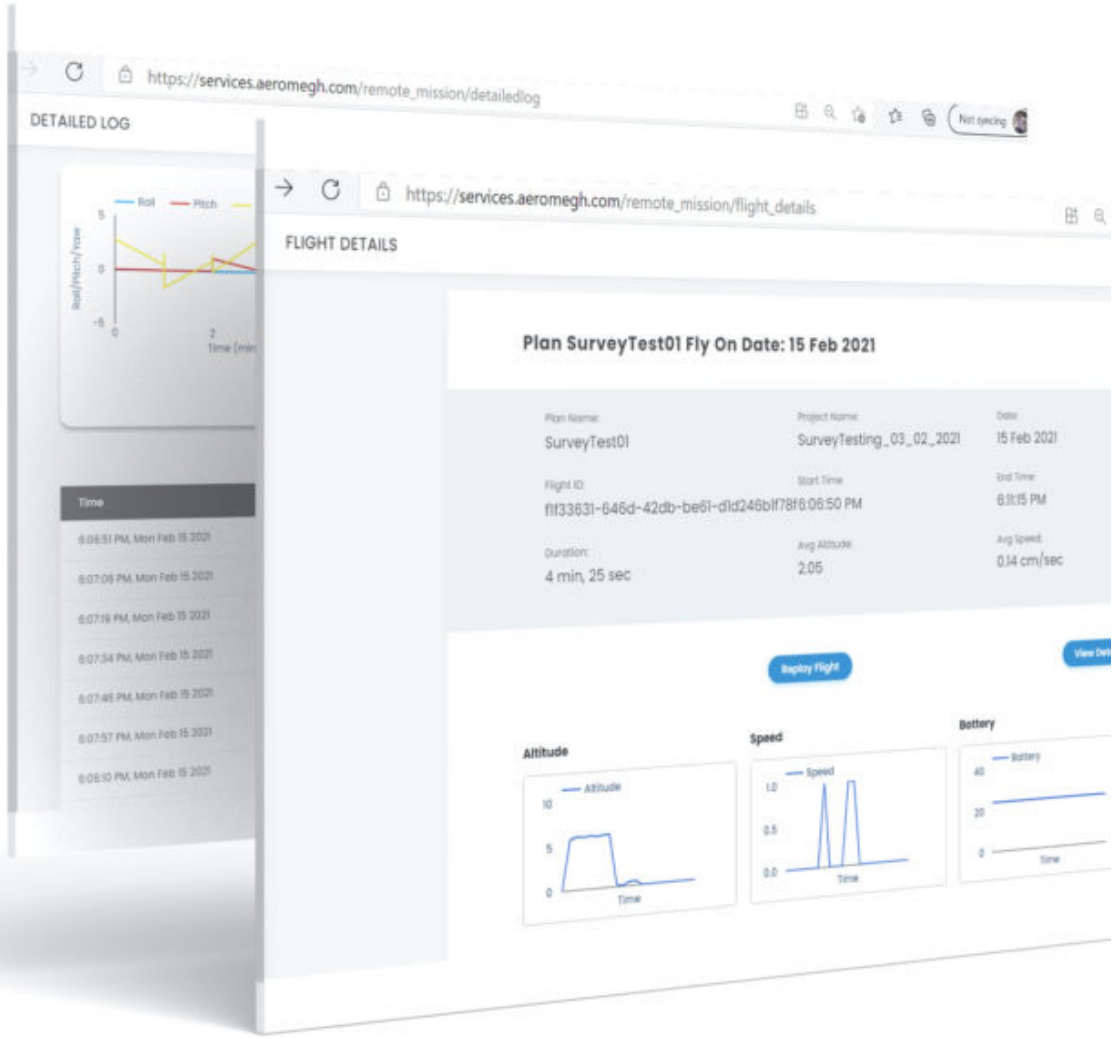
Customized Detections

With the help of machine learning Model, there will be provision to have customized objects detection to make the system scalable.

Auto – Defect Detection

One of the powerful feature of software will be auto defect detection capability of software using ML and AI.

THANK YOU!


https://services.aeromegh.com/remote_mission/detailedlog
DETAILED LOG
Roll
Pitch
Time
https://services.aeromegh.com/remote_mission/flight_details
FLIGHT DETAILS
Plan SurveyTest01 Fly On Date: 15 Feb 2021
SurveyTest01
SurveyTesting_03_02_2021
15 Feb 2021
4 min, 25 sec
2.05
0.14 cm/sec
Deploy Flight
Altitude
Speed
Battery