

# 2022 Wildfire Mitigation Plan

## Asset Management & Data Governance

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# Asset Management Overview

## In 2021, we continued our enhanced inspection programs designed to reduce the potential for wildfire ignition from our electrical equipment by:

- COMPLETING enhanced detailed inspections on all distribution poles and transmission structures in Tier 3 and Zone 1 HFTD areas and on ~33 percent of the Tier 2 HFTD and HFRA distribution poles and transmission structures;
- COMPLETING supplemental ground and aerial inspections of 71 distribution substations, 33 transmission substations and 38 hydro substations;
- USING infrared technology to identify potential risks not easily detectable, and LiDAR imaging to improve our knowledge about our assets;
- UPGRADING our intrusive pole inspection Program's field hardware and software to enhance record keeping and data system integrations.

## For 2022, our inspections and asset management programs will reduce wildfire ignition risk by:

- CONTINUING our enhanced detailed inspection programs and intrusive pole inspections for distribution and transmission facilities;
- COMPLETING supplemental ground and aerial inspections of 86 distribution substations, 43 transmission substations, and 52 hydroelectric substations to reduce potential ignition risks from these facilities located throughout HFTD areas;
- CONTINUING to evolve the effectiveness of our inspection processes and procedures;
- CONTINUING our infrared technology inspections to identify potential risks not easily detectable,
- PERFORMING LiDAR data acquisition on distribution and transmission facilities.



# Initiative Targets



2022 Initiative Targets	Date
Complete detailed inspections on 396,000 distribution poles	7/31/2022
Complete detailed ground inspections on 39,000 transmission structures	7/31/2022
Complete detailed climbing inspections on 1,800 transmission structures	7/31/2022
Complete detailed aerial inspections on 39,000 transmission structures	7/31/2022
Complete infrared inspections on 9,000 distribution circuit miles	12/31/2022
Complete supplemental inspections on 86 distribution substations	7/31/2022
Complete supplemental inspections on 43 transmission substations	7/31/2022
Complete supplemental inspections on 52 Hydroelectric Generation Substations and Powerhouses	7/31/2022
Perform Transmission and Distribution system inspection quality audits	12/31/2022
Centralize High Priority Data including implementing a process to identify data gaps in Foundry for critical risk drivers; identifying and incorporating new high priority datasets into Foundry, and incorporating 20 new, foundational ontology objects into Foundry	12/31/2022

# Data Governance Overview



## In 2021, we continued to expand our data driven approach to wildfire mitigation by:

### Foundational Asset Registry Improvements

- IMPROVING core Support Structure Asset Registry focused on wildfire areas including improvements to Asset Characteristics, Geospatial Accuracy, System Synchronization, Completeness
- MATURING Data Governance processes including establishment of a Data Governance Forum to address cross-cutting data issues

### Centralized Repository for Data (Foundry)

- INCREASING our capacity to deliver new, high-quality data objects into Foundry data platform – 50+ data source systems connected, 436 ontology objects
- DEVELOPING eight new wildfire-related analytic and situational intelligence products

## In 2022, we will be building on our data capabilities by:

### Foundational Asset Registry Improvements

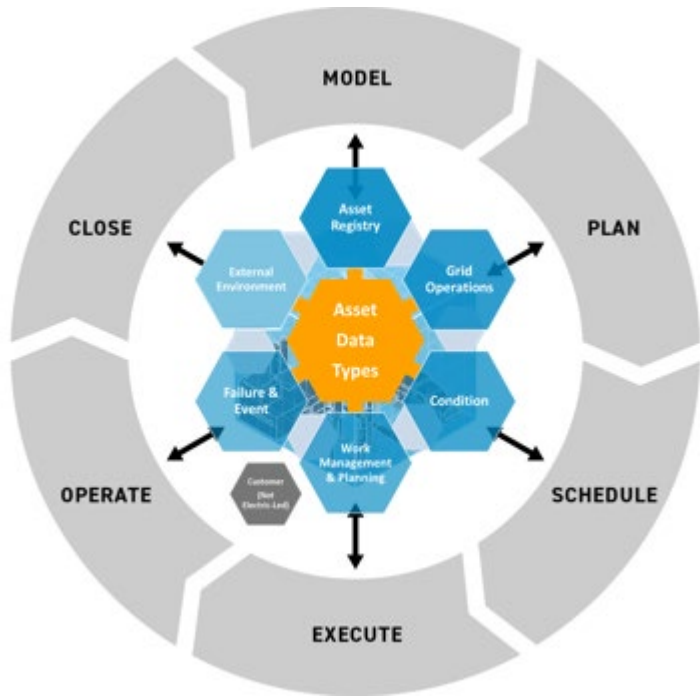
- EXPANDING data quality initiatives to additional high priority Asset Classes.
- DEVELOPING and implementing standards to codify Asset Registry system and process governance

### Centralized Repository for Data (Foundry)

- EXPANDING the electric operations data available in Foundry data platform; and,
- DEVELOPING new analytic and situational intelligence products within the data platform, and maturing platform governance.



# Foundry Data Products

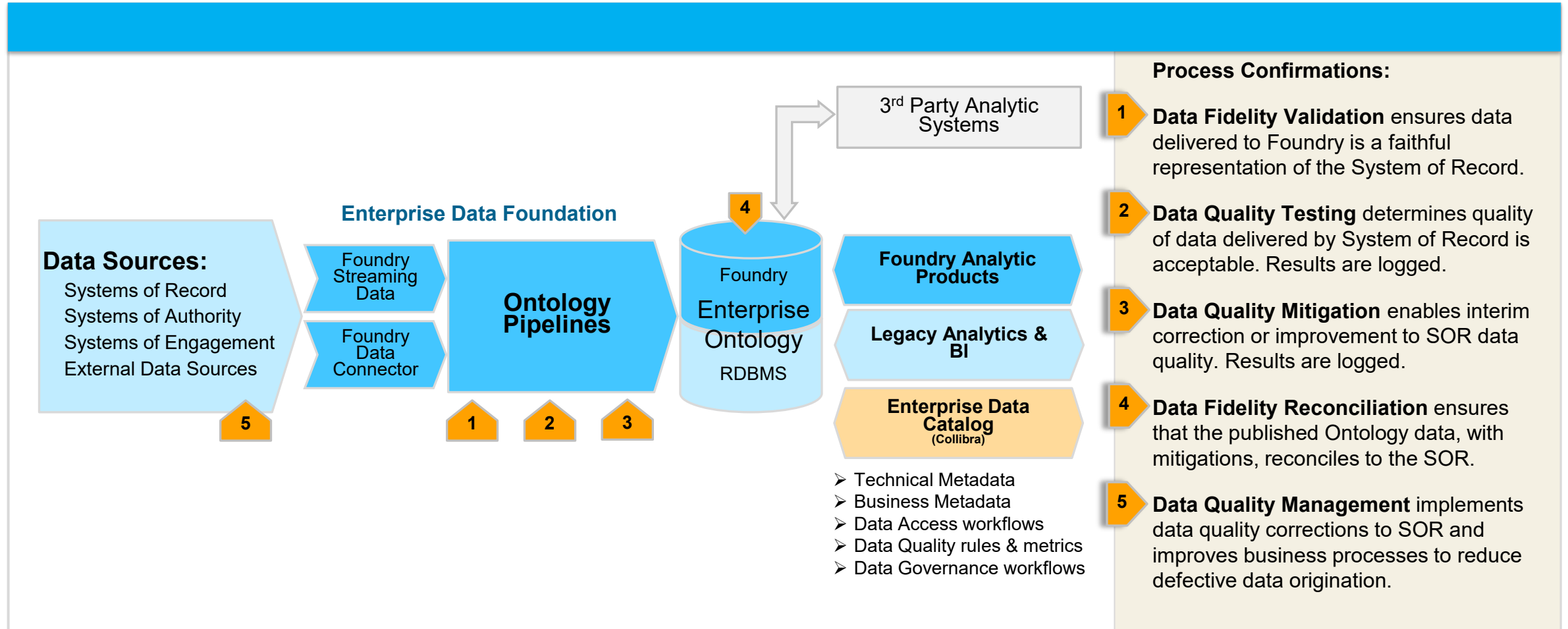


Strategic Theme	Product / Purpose	
Wildfire Risk Management and Operations	1	<b>PSPS Situational Intelligence Platform:</b> Provide timely, precise, accurate information to de-energizing the right lines; provide foundation for external data sharing and event documentation
	2	<b>Wildfire Risk Command Center:</b> Enable visibility and understanding of work plan status for 53 WMP commitments.
	3	<b>Grid Data Analytics Tool (GDAT):</b> Accelerate detection / resolution of unknown cause outages; set foundation for real time outage management and predictive analytics
Risk Modeling	4	<b>T-Line Operability Assessment:</b> Streamline PSPS scoping; composite Transmission risk model.
	5	<b>Transmission Composite Model:</b> Develop composite models to understand the fire ignition risk from Electric Transmission Assets
	6	<b>Wildfire Distribution Risk Model:</b> Ensure access to trusted risk scores for workplan creation.
Integrated Grid Planning	7	<b>Asset Maintenance &amp; Compliance Platform :</b> Efficiently produce accurate asset inspection plans that address compliance requirements/ commits.
	8	<b>Integrated Planning Undergrounding Tool Development:</b> Develop effective, transparent, data driven decision process and tool to select which lines the company will underground.
	9	<b>Asset Failure Analysis:</b> Provide precise asset failure data for risk modeling and failure prediction models.
Reporting	10	<b>OEIS (WMP) GIS Data Standard &amp; Automation:</b> Increase efficiency and completeness of data reporting to meet WMP requirements/ commitments; connect key assets and wildfire initiatives.



# Target State Architecture – Palantir Foundry

Bringing foundational data sets from disparate data sources together in a central data platform for use in developing new situational intelligence and analytic capabilities to enable wildfire mitigation





# Questions & Feedback



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# Documentation & Disclosure of Wildfire-Related Data Overview

	In 2021, we enhanced our quarterly reporting through the following:	In 2022, we will continue expanding our reporting capabilities by:
<b>GIS Data Standard (Spatial QDR)</b>	<ul style="list-style-type: none"> <li>• <b>IMPLEMENTED</b> process improvements around the collection, curation, and organization of data inputs</li> <li>• <b>ADOPTED</b> revised requirements from the Energy Safety, as introduced in GIS Data Standard V2, V2.1, V2.2</li> <li>• <b>ADDED</b> Metadata to help describe data inputs</li> <li>• <b>LEVERAGED</b> Foundry to drive connectivity between select source systems and data sets, enabling reporting of formerly distinct data</li> </ul>	<ul style="list-style-type: none"> <li>• <b>TRANSFORMING</b> PG&amp;E’s data to provide additional required fields to meet GIS Data Standard requirements</li> <li>• <b>REPORTING</b> on more WMP programs</li> <li>• <b>ADAPTING</b> automations and submissions to meet evolving revised version releases</li> <li>• <b>ALIGNING</b> with other wildfire data reporting (e.g., QDR, QIU)</li> </ul>
<b>Quarterly Data Report (QDR)</b>	<ul style="list-style-type: none"> <li>• <b>SUBMITTED</b> Q1-Q3 2021 Quarterly Data Reports and revised data as needed within the 12 data tables</li> </ul>	<ul style="list-style-type: none"> <li>• <b>ADOPTING</b> revised requirements as introduced from Energy Safety’s Wildfire Mitigation Revised Guidelines released 12/15/21</li> </ul>
<b>Quarterly Initiative Update (QIU)</b>	<ul style="list-style-type: none"> <li>• <b>ADDED</b> four “Addressing Extreme Drought Conditions” initiatives under Category “Protocols on Public Safety Power Shutoff” and Initiative Activity “Strategy to Minimize Public Safety Risk During High Wildfire Risk Conditions.”</li> <li>• <b>INCLUDED</b> all initiatives from the 2021 WMP in the QIU working file by adding all “Other” sections</li> <li>• <b>IMPLEMENTED</b> a pilot program in Foundry to build QIU reporting functionality</li> </ul>	<ul style="list-style-type: none"> <li>• <b>REPORTING</b> out on 51 targeted initiatives prioritized by impact of wildfire mitigation (PG&amp;E’s 2022 WMP section 7.3)</li> <li>• <b>IMPLEMENTING</b> all reporting functionality – including progress updates, approval process and uploading of supporting file within Foundry</li> </ul>



# Asset Management & Data Governance

**Jennifer Kaminsky**

Manager, Electric Assets & Compliance

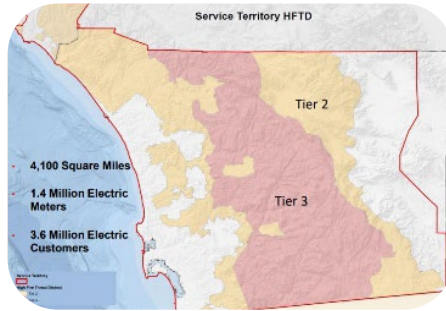
**Rob Malowney**

Manager, Asset Data Systems & Records

# Asset Management Inspection Programs



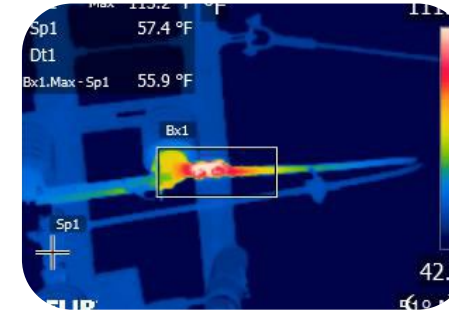
## Enhanced Inspections



*Special HFTD Tier 3 inspections*



*Drone assessments*



*Infrared inspections*



*LiDAR inspections*

## Traditional Inspections



*Detailed overhead visual inspections*



*Patrols*

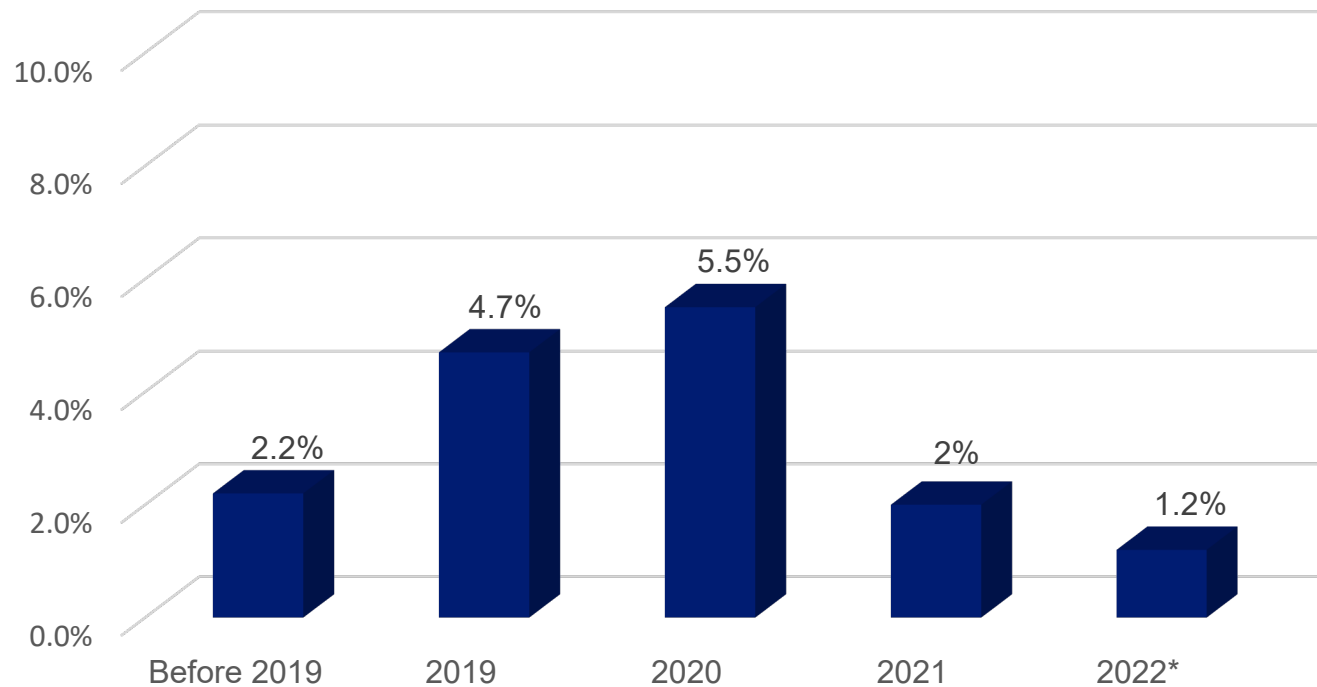


*Intrusive pole inspections*

# Drone Assessments

- Tier 3 HFTD drone assessments began in 2019
- > **95%** of repairs identified during Tier 3 drone assessments in 2021
- > **400%** decrease in issues from 2020 to 2022

% Tier 3 Distribution Poles w/ Issues



\* YTD ~ 75% Tier 3 QC inspections complete



# IIP – Creating Opportunities for Artificial Intelligence Integration



*Intelligent Image Processing (IIP) uses machine learning to automatically identify assets & damages in imagery captured from the field*

## Images & Poles Automatically Assessed



## Accuracy of IIP Models

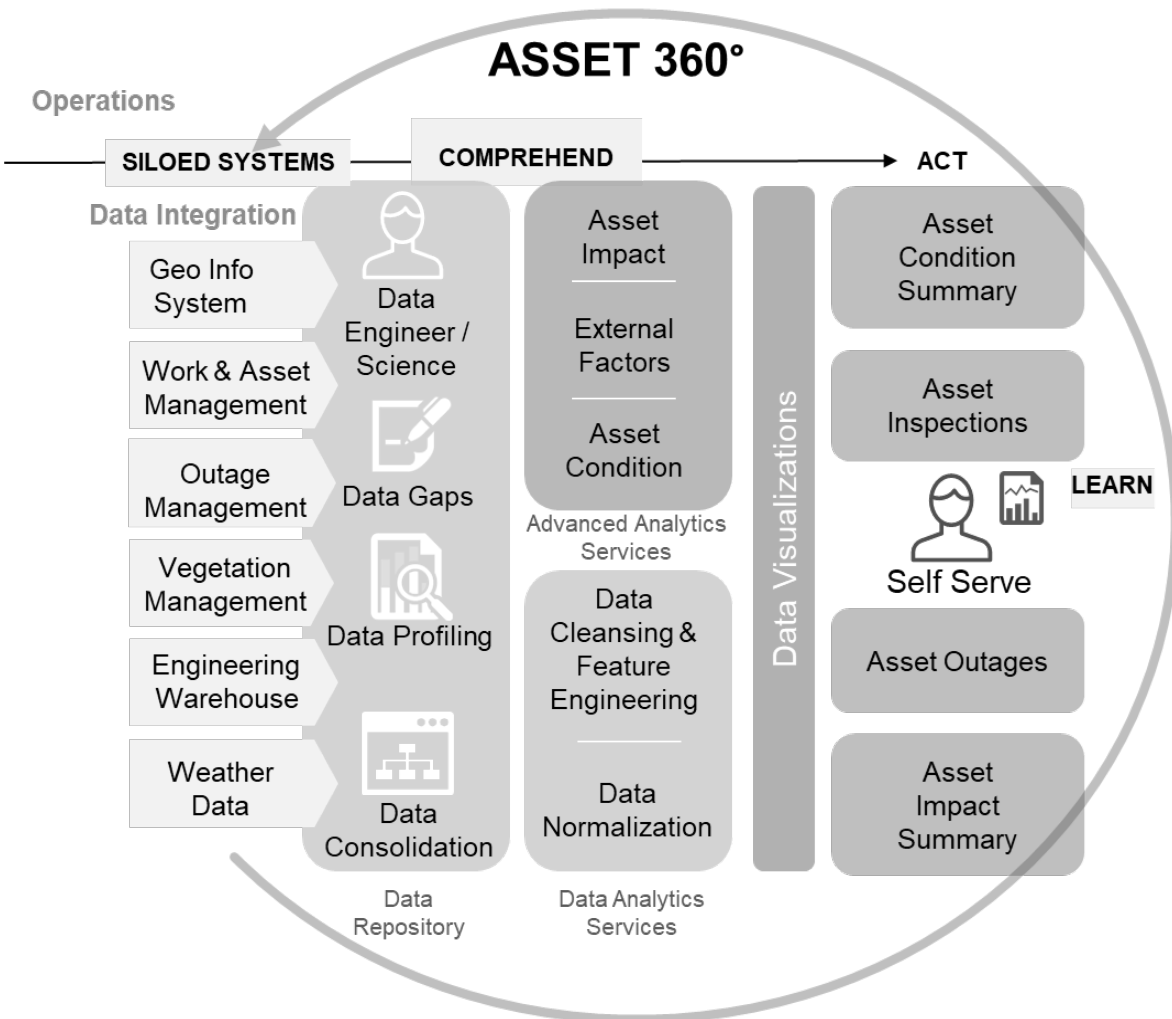


## Damage Detection Models Running Daily



*\*As of 2/28/2022*

# Asset 360 Data Program



## 2021 Accomplishments

- Built consolidated data models and dashboards for:
  - *distribution poles, wires, cables, tees, capacitors and switches (including asset condition predictions)*
  - *transmission structures, conductor and hardware*
- Created baseline measurements for data quality & accessibility for select distribution assets

## 2022 Planning

- Build consolidated asset data models, asset condition predictions & dashboards for:
  - *distribution secondary, OH connectors, transformers and fuses*
  - *transmission underground connectors and select substation assets*
- Improve data quality through source system remediations for both distribution & transmission
- Integrate with IIP to improve data quality & model accuracy

# Data Governance Focus & Priorities

By OEIS Guideline Areas



## Centralized repository for asset data

- Integrated >20 data sources, automating >350 / 560 metrics
- Consolidated non-spatial & spatial data
- Implemented internal program dashboards
- Enabled data quality visibility by developing scorecards



## Collaborative research on utility ignition and/or wildfire

- Increased situational awareness through partnerships with academia & government agencies
- Data sharing & development of statewide modeling tools
- Academic partnerships include Cal Poly Wildland Urban Interface (WUI) FIRE Institute & San Jose State University's Fire Science Lab
- DOE Partnership for Energy Sector Climate Resilience Initiative



## Documentation & disclosure of wildfire-related data & algorithms

- Documented >20 data sources within the central repository
- Defined >260 terms in data governance glossary
- Of 350 automated metrics, documented >50 metric automation processes & 10 data governance framework areas
- Completed seven audits of the 10 data governance framework areas



## Tracking & analysis of risk event data

- Trending analysis on 20 monitored metrics
- Solidified processes for gathering ignition & near ignition data & refined information workflows
- Leveraged ignition & outage data in Probability of Ignition (POI) models to create foundational knowledge informing WMP initiatives

**Thank you**

# APPENDIX



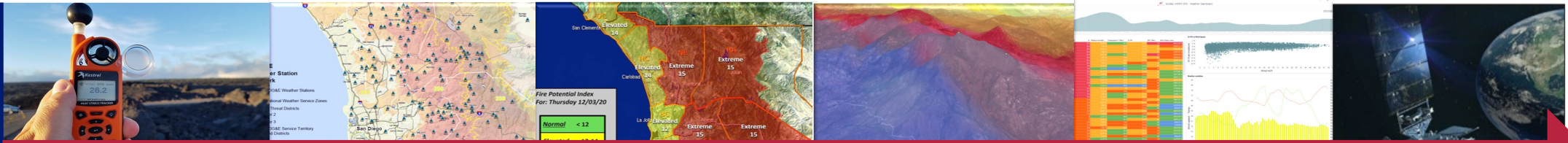


# More Than a Decade of Wildfire Mitigation Evolution



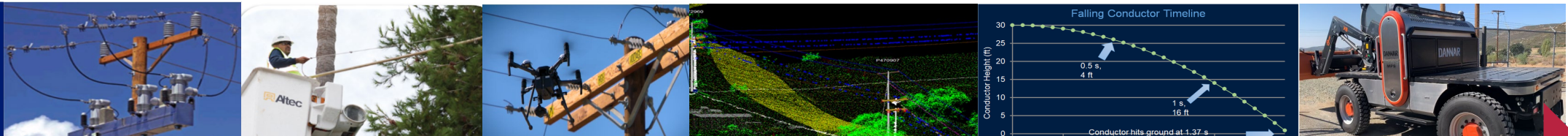
*More than 14 years of persistent effort & investments resulting in significant wildfire safety improvements at the lowest cost possible for our customers*

## Situational Awareness



221 Weather Stations • 110+ Cameras Monitored • AI-Based Forecasting • Reduced PSPS Impacts

## Engineering & Operations

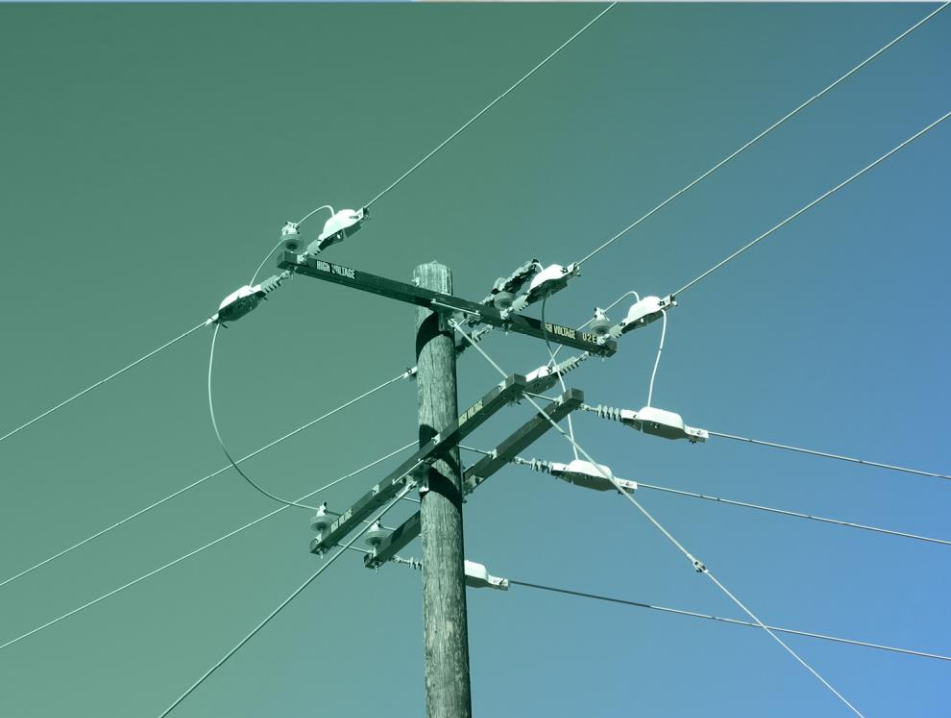


92% HFTD Transmission Hardened • 900+ mi HFTD Distribution Hardened • Transmission Faults Reduced 84% • Distribution Faults Reduced 45%

## Outreach & Education



Enhanced Community Resiliency • Annual Wildfire Safety Fairs • 3600+ Generators Distributed • 11 Community Resource Centers



**2022**  
**WILDFIRE MITIGATION**  
**PLAN UPDATE**

# Agenda

Presenters: Ray Fugere – Principal Manager, Wildfire Mitigation Strategy  
Angie Torres – Principal Manager, IT Project Management

## Topics



- 1 Asset Management & Inspections
- 2 New Inspection Approaches  
Piloting in 2022
- 3 Data Governance

# Asset Management & Inspections Overview

SCE inspects its overhead transmission, distribution and generation equipment annually in High Fire Risk Areas (HFRA) to identify potential safety hazards

- Perform High-Fire Risk-Informed (HFRI) ground and aerial inspections on **~150,000 (53%) distribution assets** and **~16,000 (43%) transmission assets**
- Continue to obtain a **360-degree view** of our equipment, where possible
- Perform **grid patrols annually on all** transmission and distribution assets
- Perform any needed maintenance, repair or replacement

Damaged Primary Conductor on a 12kV Circuit

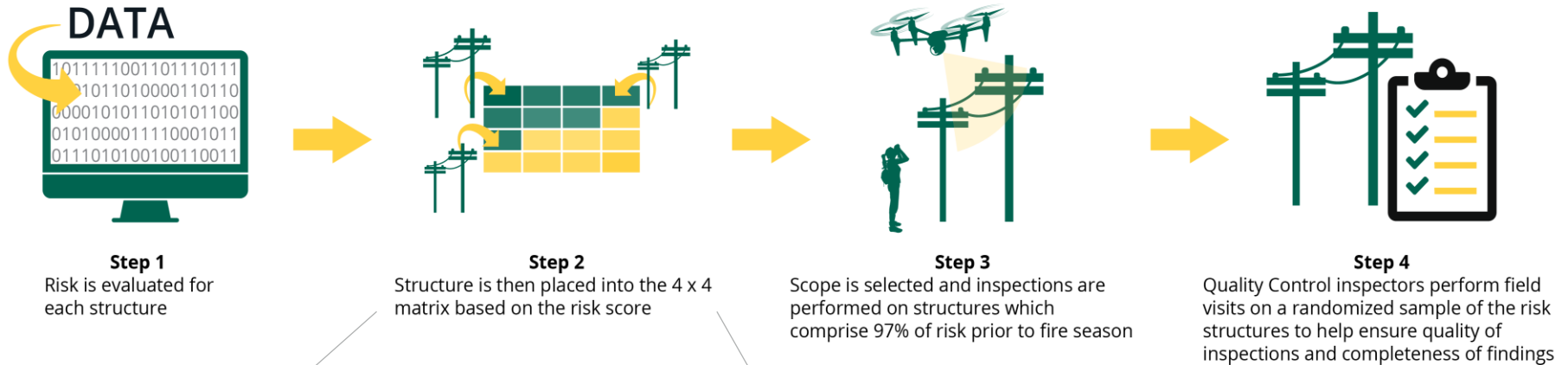


Distribution Switchblade Alignment Issue (Drone Capture)



# Asset Management & Inspections Overview

In 2022, risk analytics continue to inform the scope of SCE's Transmission and Distribution High-Fire Risk-Informed inspection programs in HFRA



Probability of Ignition	Level 1	1.9%	0.3%	0.1%	0.1%	% of Structures
		0.2%	1.1%	3.3%	10.1%	
	Level 2	4.7%	0.8%	0.5%	0.4%	
		0.2%	1.4%	4.1%	13.9%	
Level 3	9.0%	1.9%	1.3%	1.0%		
	0.2%	1.6%	5.8%	18.0%		
Level 4	41.7%	12.8%	12.0%	11.3%		
	0.2%	1.8%	8.3%	29.7%		
	Level 4	Level 3	Level 2	Level 1		
	Consequence					

**Legend:** Inspection Frequency

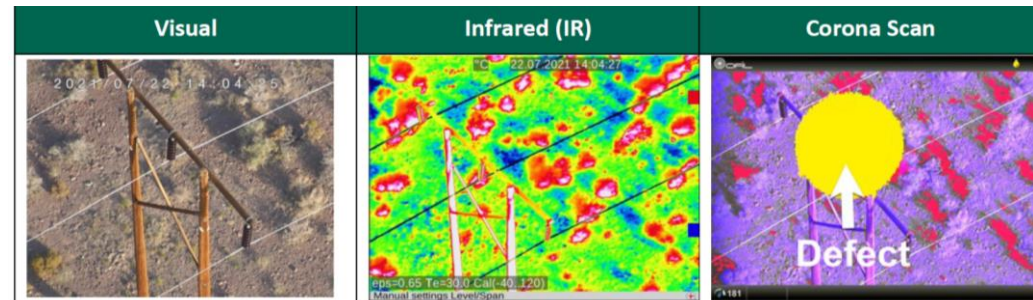
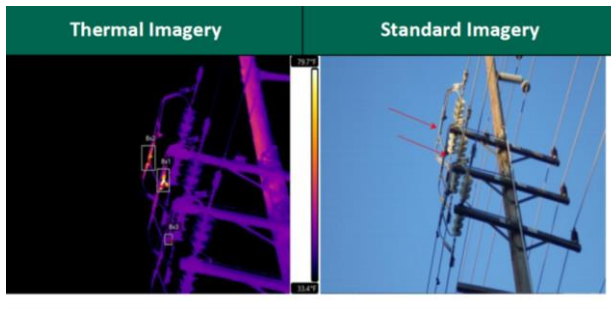
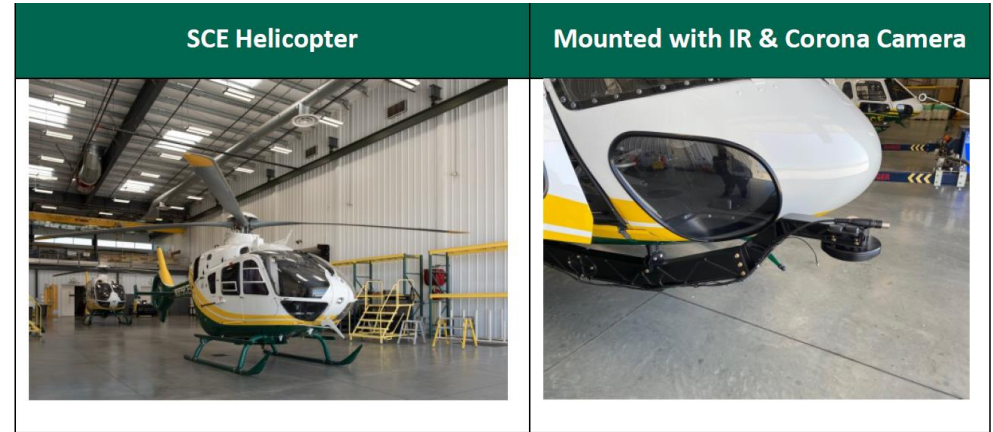
Red = Every Year

Green = Every Three Years

# Asset Management & Inspections Overview

In 2022, SCE will continue to perform infrared inspections and corona scans in HFRA

- **Infrared Inspections (IR) and Corona Scans** can act as leading indicators of asset failure by detecting thermal differences not visible to the human eye
- **2022 Scope**
  - Inspect distribution overhead lines not inspected in 2021 (~4,400 circuit miles) in HFRA utilizing IR
  - Inspect 1,000 circuit miles of transmission OH lines in HFRA utilizing IR and corona scans



# New Inspection Approaches Piloting in 2022

## Secondary conductor ignitions



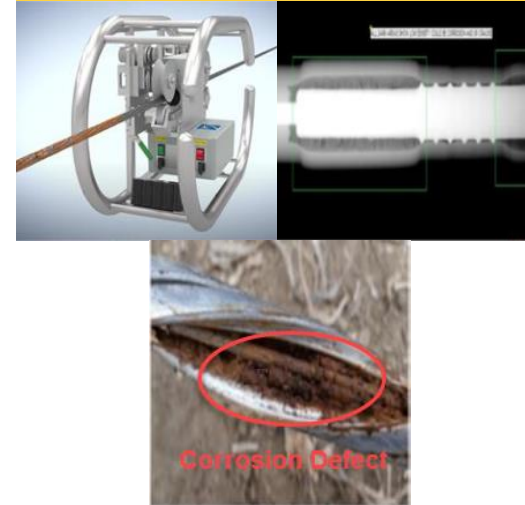
### Risks to be mitigated:

- CPUC-reportable ignitions in HFRA related to secondary conductors

### 2022 target:

- Inspect and trim vegetation around 700 secondary structures and tape connectors on ~3,000 secondary structures

## Transmission wire down



### Risks to be mitigated:

- Transmission wire down events throughout SCE service area

### 2022 target:

- Inspect 75 spans with LineVue<sup>1</sup>, inspect 50 splices with X-Ray, and obtain five conductor samples, in order to replace or remediate conductor and/or splices that have higher probability to fail

1. LineVue determines the deterioration of the steel core cross-sectional area of the conductor steel core and detects any localized breaks or corrosion pits on the steel wires and loss of zinc galvanized layer.

# Data Governance Overview

SCE's Data Governance platform projects, **Ezy Data** and **WiSDM**, provide foundational capabilities to enable many of SCE's wildfire mitigation initiatives

## Ezy Enterprise Data (EzyData)

Google Cloud Platform (GCP)

Repository for **Unstructured** data

- Implements AI/ML advanced analytics
- Real-time ingestion
- Increases efficiencies in analysis of imagery
- Improves remote sensing data quality

Enables **scalable, enterprise-capable** data science capabilities

- Eliminates reliance upon on-premises data centers with limited capability
- Visualization of Remote Sensing Data

## Wildfire Safety Data Management (WiSDM)

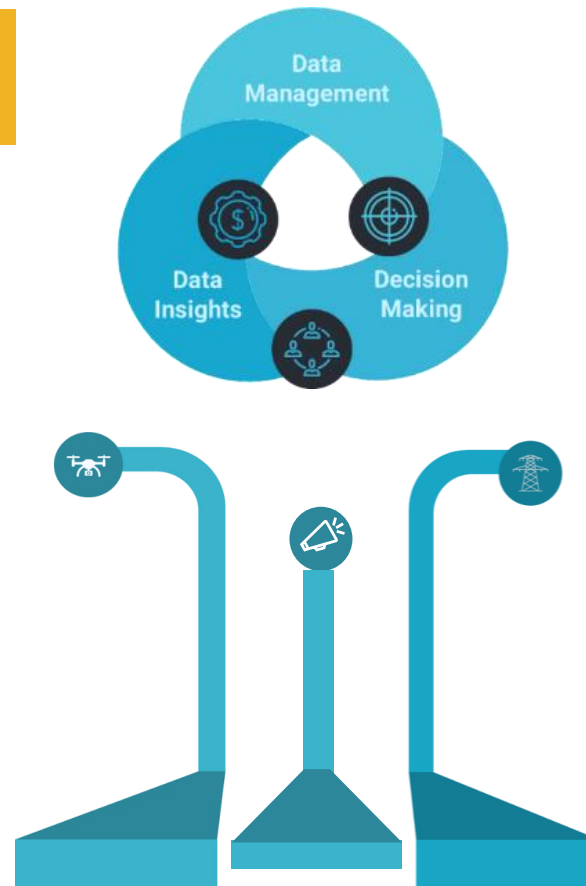
Centralized Data Repository and Portal

Central warehouse for **Structured** data

- PSPS & Risk Events
- Grid hardening
- Situational awareness
- Vegetation management inspections
- Asset information

Portal for external **data sharing**

- Secure data sharing with internal & external stakeholders
- Accurate, efficient, and timely reporting
- Reporting & Analytics



SCE is leveraging an OCM approach that includes business process owners with a focus on data governance, process, and documentation standards to ensure process and tool adoption and adherence to standards



# Increased Utilization of AI/ML in 2022 (EzyData)

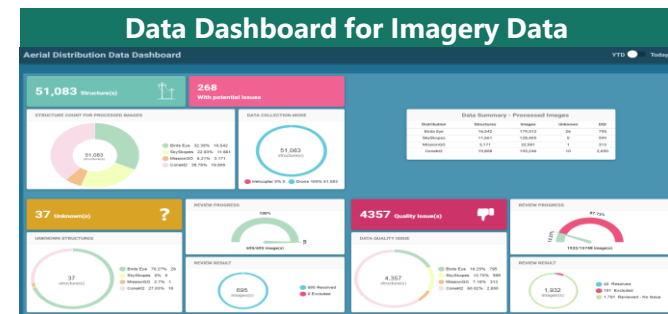
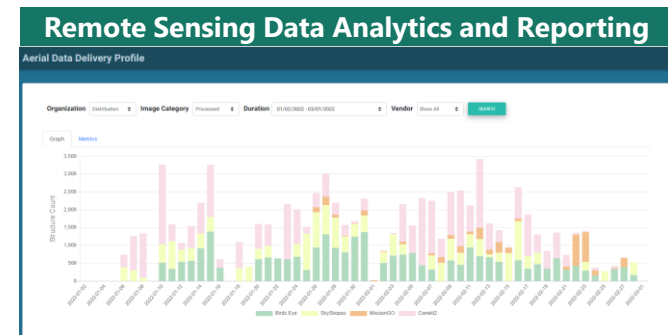
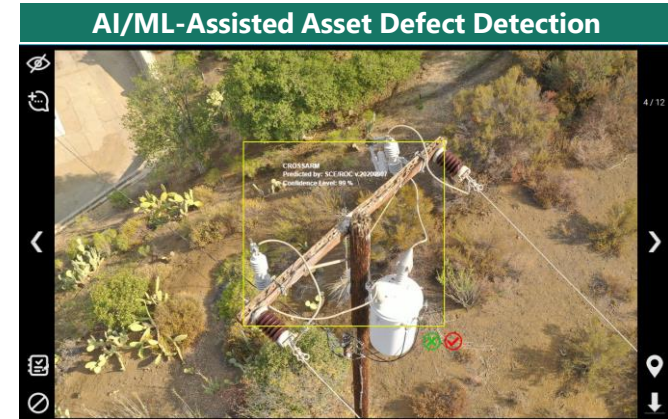
Effective management of remote sensing imagery is crucial to the objectives of wildfire mitigation inspections & remediations

## Achievements 2021

- Enabled cloud platform with automatic scaling & 24x7 access capability
- SCE-wide access to imagery data with fast search, retrieval, and visualization
- Near real-time data ingestion with quality checks, data management, and workflows to automatically process and organize data (>11 million images to-date)
- AI-supported asset defect detection

## Plans for 2022

- Expand the use of AI/ML models for automated asset defect detection
- Enable enterprise AI platform for scalable AI/ML lifecycle management
- Integrate with inspection tools for image visualization & inspection workflows
- Enable LiDAR data management capability



# Increased Wildfire Data Integration in 2022 (WiSDM)

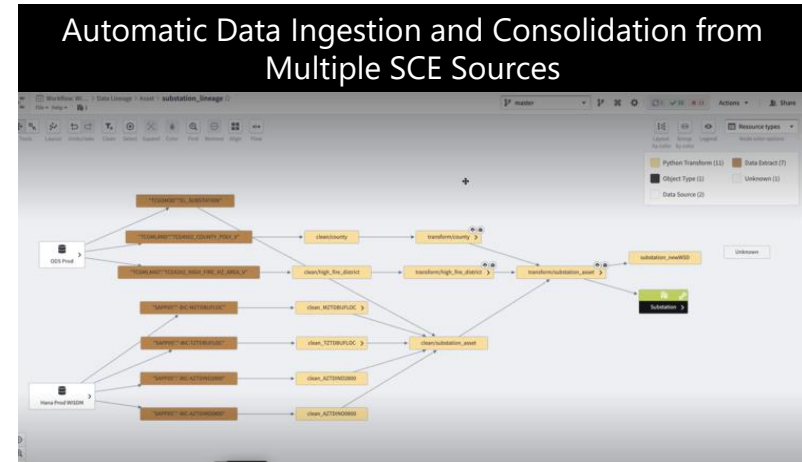
Implement a centralized wildfire data repository and data portal to enable efficient reporting with comprehensive spatial & non-spatial data

## Achievements 2021

- Built future-forward architectural design
- Conducted data validation workshops
- Initiated the consolidation of SCE wildfire mitigation datasets

## Plans for 2022

- Continue data validation workshops with users
- Consolidate wildfire data platform onto central repository
- Complete design of external data sharing portal



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Thank You