ENHANCE.
ENRICH.
EMPOWER.

gondwana LLC

Ecological Defense Microservices

IoT, Platform Analytics, & Modeling to Protect Coral Reefs

#HackinSAS 2021 – [Track: Data for Good]

gondwana [gond-wah-n*uh*] (landmass) *noun*
an ancient supercontinent that broke up into Africa, South America, Australia, Antarctica, India, and Arabia.

OUR MISSION

We empower our conservation customers with technology and data-driven tools - ensuring fast, accurate, & actionable insights, and safer and more effective ecological protection efforts.

Gondwana

OUR VISION

Protected environments that are more secure and more open, with improved biodiversity, for the benefit of society at-large.

ENHANCE.
ENRICH.
EMPOWER.

OUR CUSTOMERS

Smaller scale global conservation programs that need assistance in developing, implementing, and deploying intelligent, accurate, & secure prediction tools as countermeasures to protect biodiversity.

OUR PARTNERS

Counter Wildlife Trafficking Institute (CWTI) (2019)

Maryville University (2019)

Conservation X Labs (2020)

SAS (2021)

MARYVILLE UNIVERSITY

CWTI COUNTERING WILDLIFE TRAFFICKING INSTITUTE

CONSERVATION X LABS

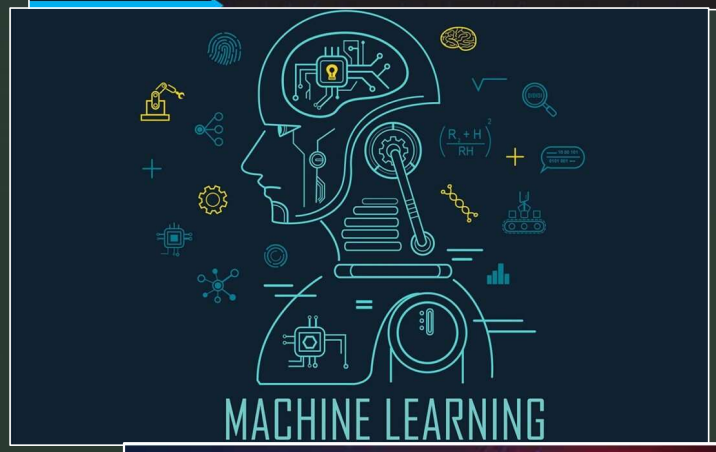
HOW? – TECHNIQUES (2019)

TECHNOLOGY

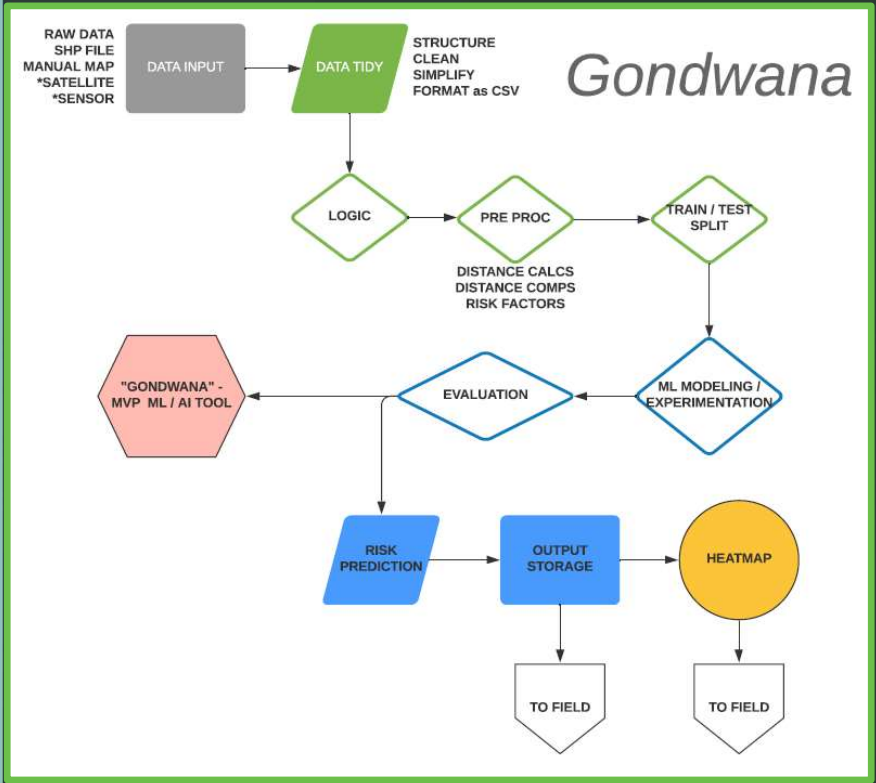
- ***Custom*** Data Curation
- ***Applied*** Data Science
- ***Modern*** AI/ML/Infosec
- ***Precision*** by Design

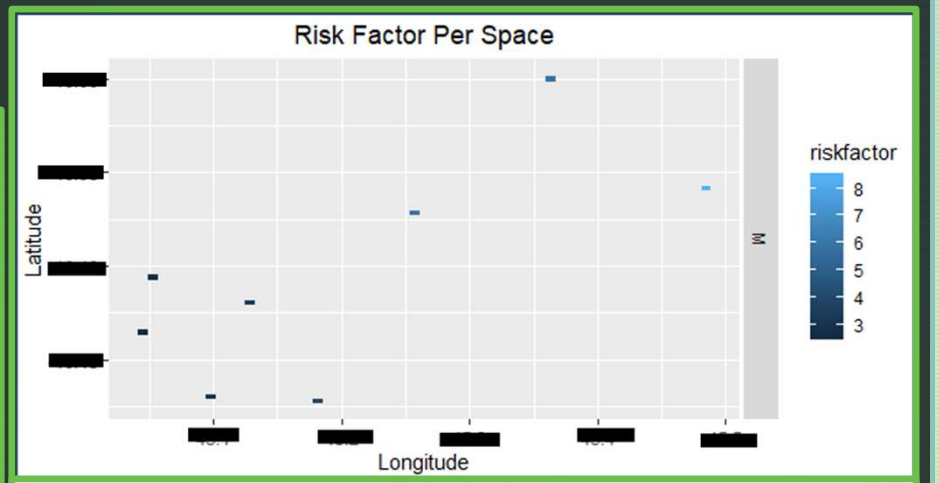
BUSINESS

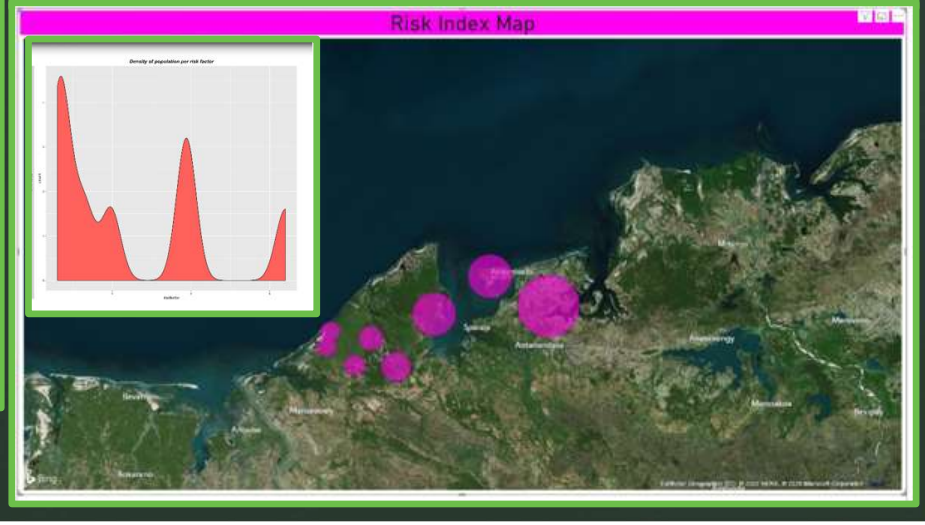
- ***Multi-Domain*** Partners
- ***Discovery*** Obsession
- ***Business*** Canvasing
- ***Start*** *Small,* ***Scale*** *Smart*



GONDWANA 2020 – SMALL SCALE / TAILOR MADE !







#HackinSAS 2021 - WHY CORAL REEFS?

PROBLEM / OPPORTUNITY

- Coral reef *[disease / destruction]* is increasing at an alarming rate.
- A variety of factors contribute to this:
  - climate change, human activity, unknowns
- Reef health factors <u>are</u> *[known / measurable]*:
  - light, temperature, salinity, sedimentation

IoT, Data Analytics, & Modeling can help conservationists more effectively protect, maintain, & restore coral reef health !

THE PAINS

- Sparse and varied data
- Limitations in actionable information
- Unknown accuracies in risk identification
- Time-delay with protection efforts
- Rapid changes in environment

REQUIREMENTS – ECOSYSTEM + PLATFORM THINKING

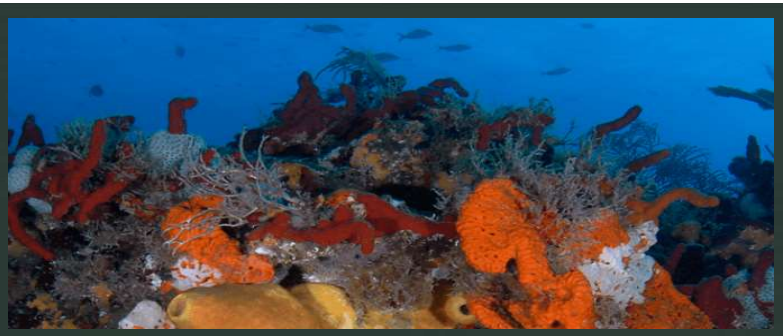
SCALABILITY

- ***Sensitivity / Specificity***
- ***Quality / Control***
- ***Speed***
- ***Interoperability***
- ***Reproducibility***
- ***Customer Confidence***

SAS ANALYTICS PLATFORM

- ***Efficient Data Planning***
- ***Intelligent Decisions***
- ***Quicker Insights / Outcomes***
- ***Multi-model/tool integration***
- ***Reliable + Robust !!!***
- ***Scalable + Fast !!!***

WHAT? – METHODS (2021)



DATA FUSION

- ***IoT Sensor(s)*** *(*Data Stream)
- ***Climatology*** (Open Source)
- ***Trends*** **(**Historical / Global)

DATA CURATION

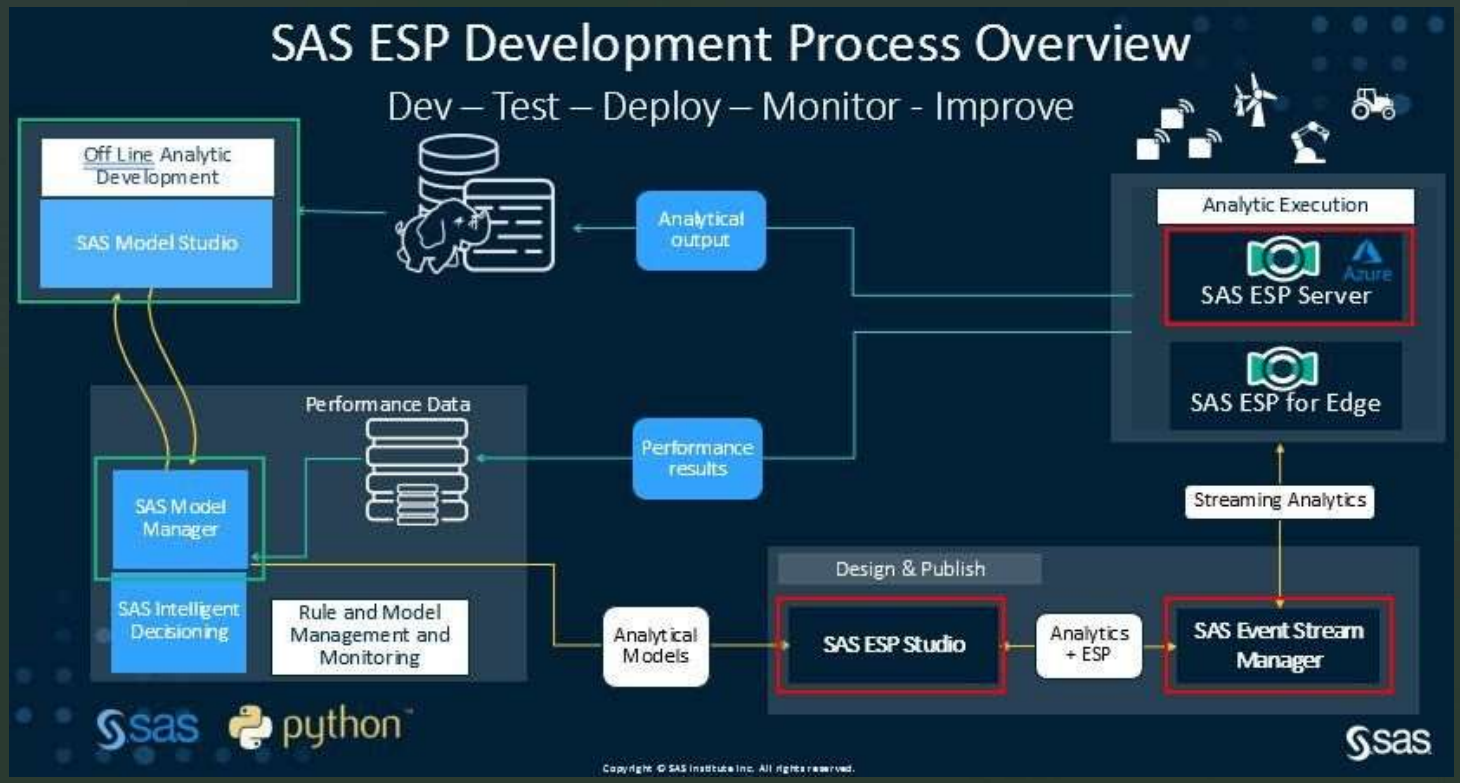
- ***Format / Prepare***
- ***Structure / Control***
- ***Merge***
- ***Validate***

ANALYZE / MODEL / REPEAT

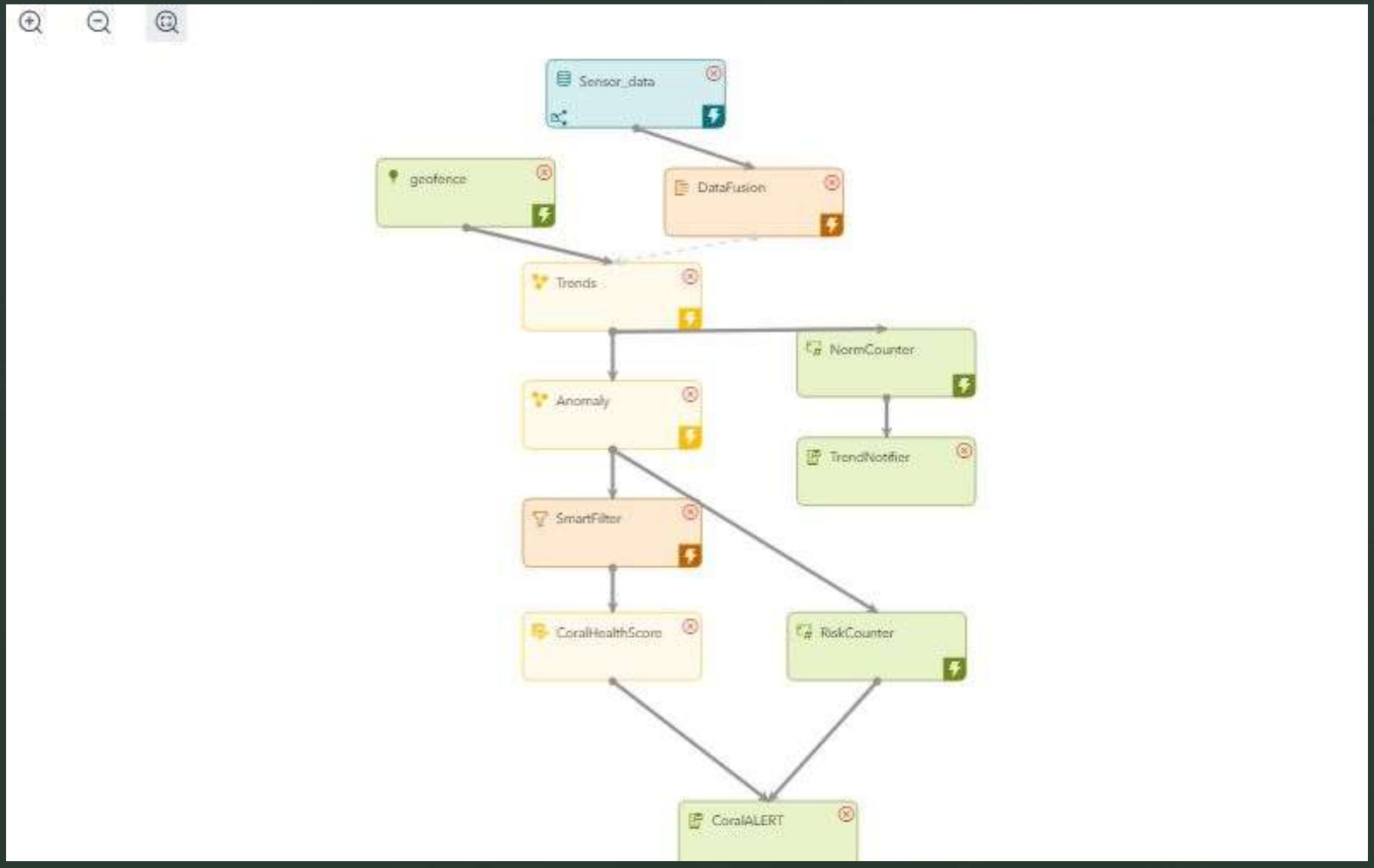
- ***Model***
- ***Detect*** (Anomaly)
- ***Profile*** (Risk vs. Normal)
- ***Alert*** *(*Early Warning/Alarm)

Retrain / Iterate / Improve !
Precision / Quality !!

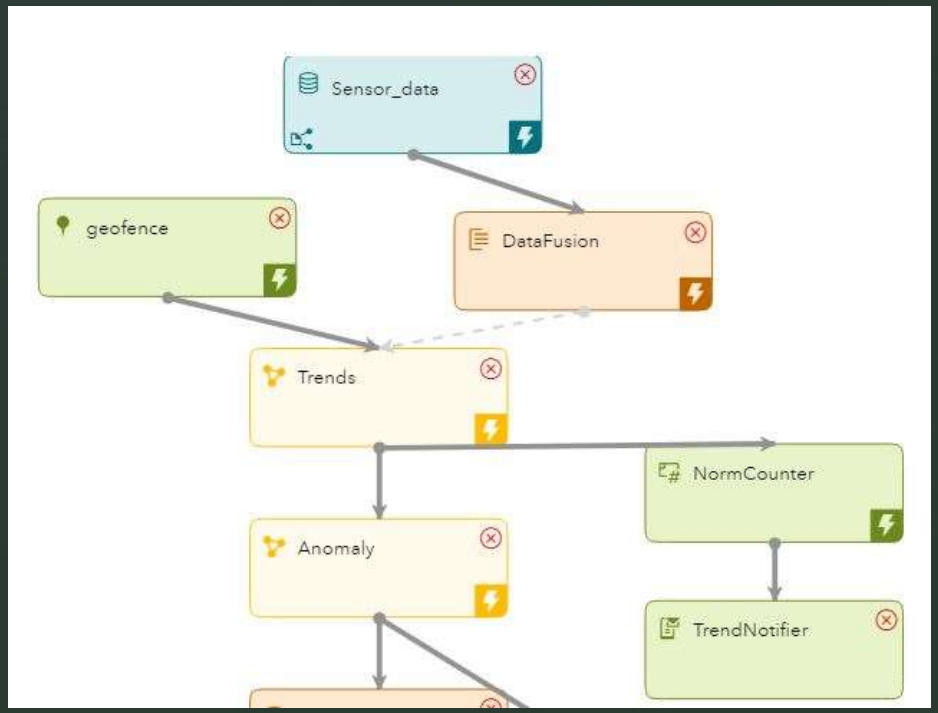
GONDWANA 2021 – PLATFORM THINKING / SCALABLE !!



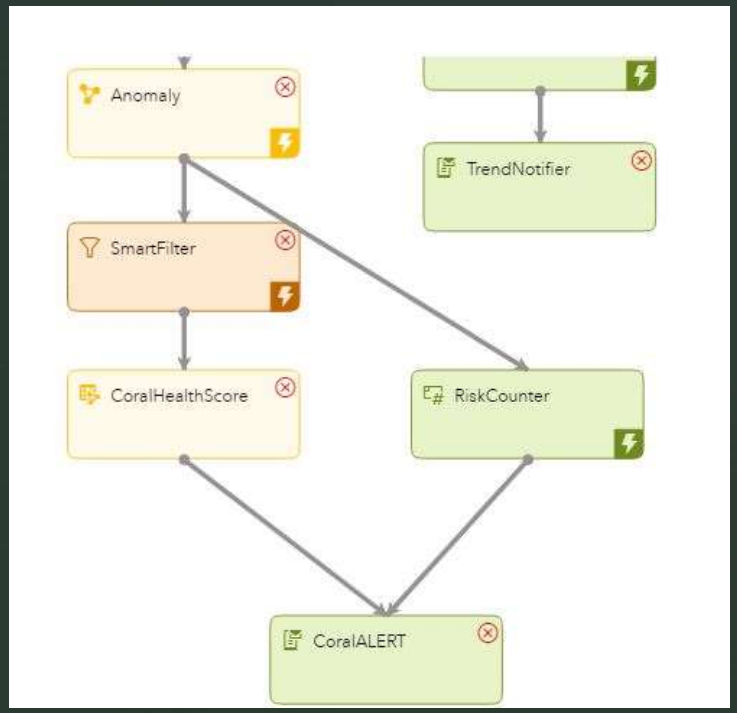
MVP TOOL: SAS ESP FOR CORAL REEF IOT MONITOR / MODEL



MVP TOOL: IOT DATA + SAS ESP + CUSTOM MODELING

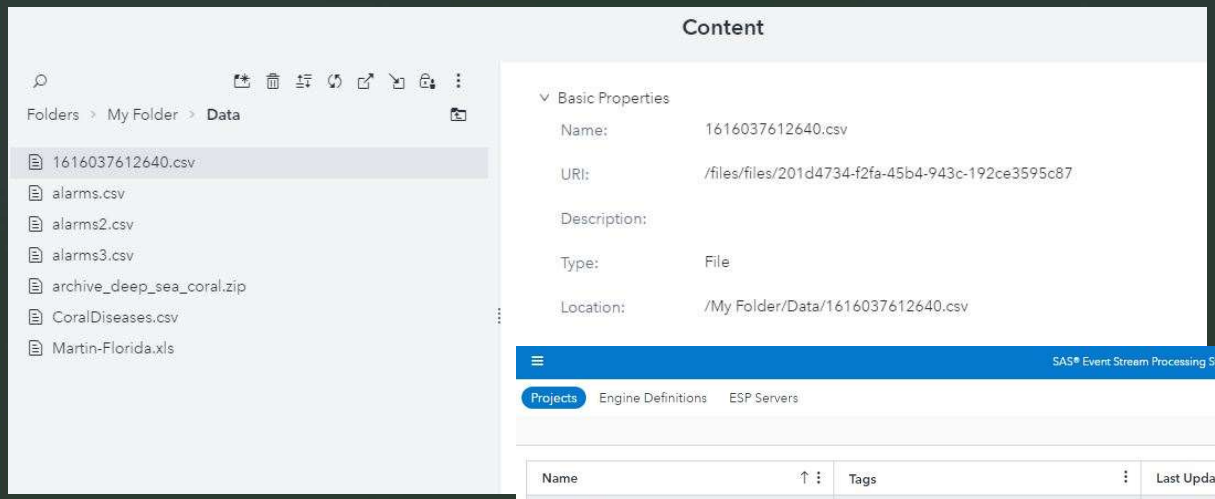


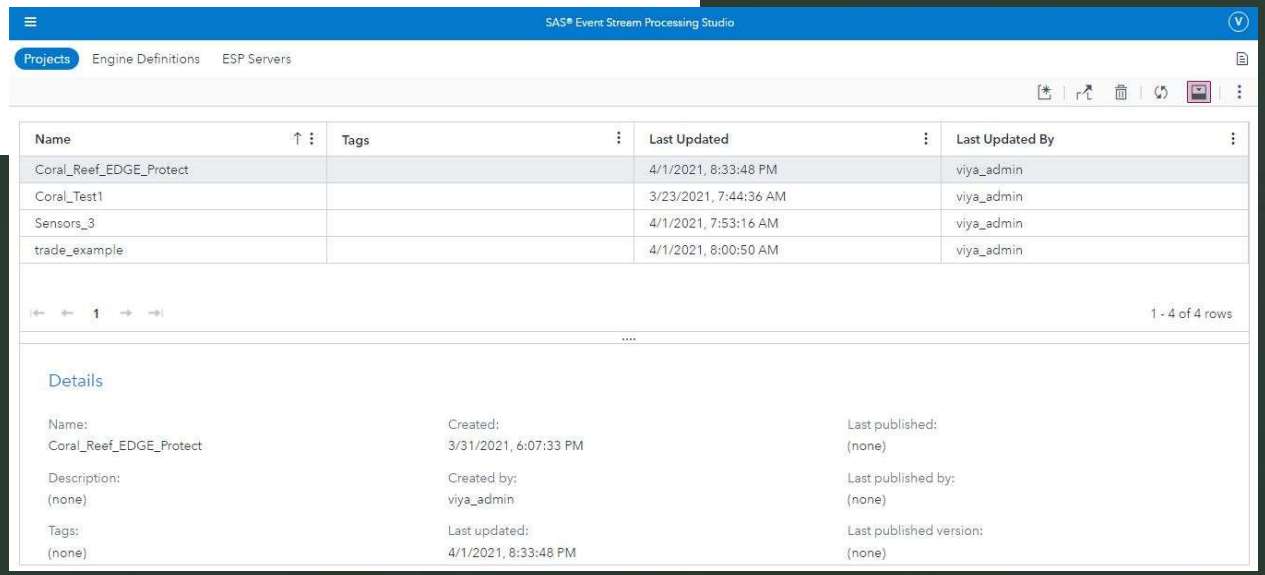
INPUT



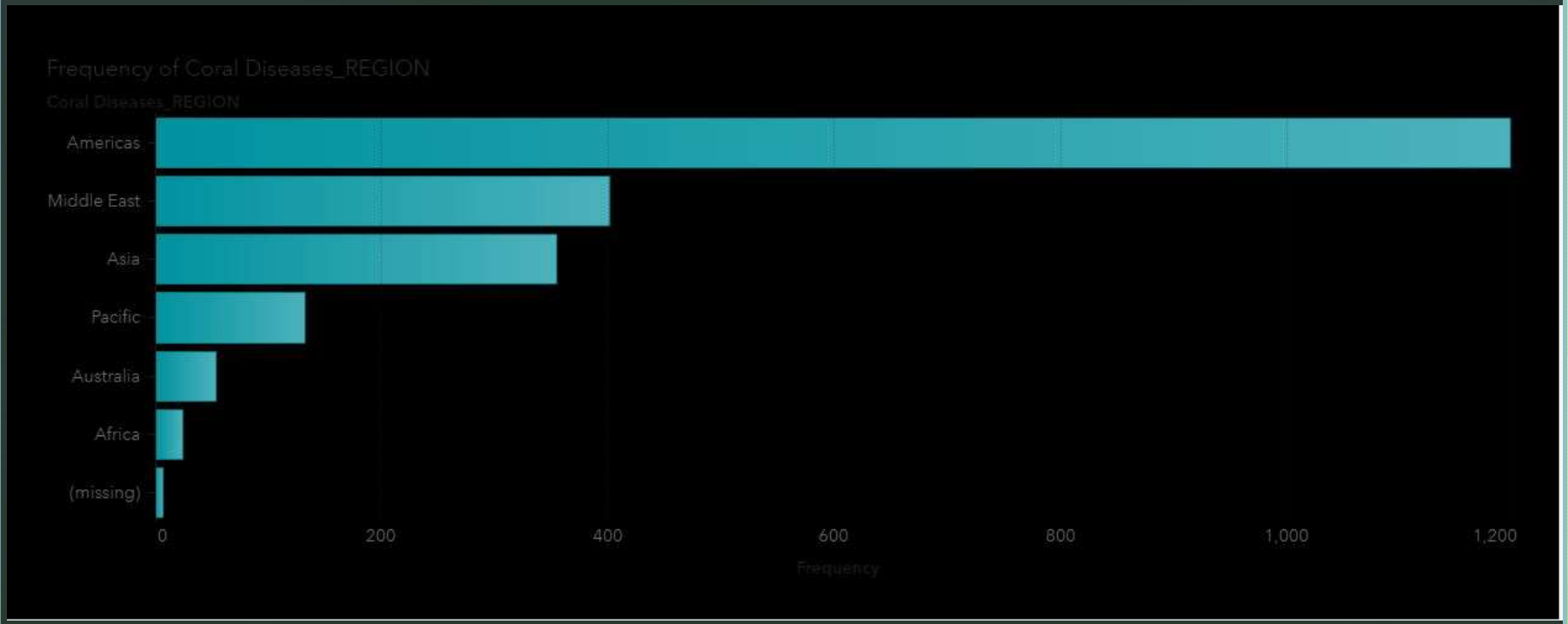
OUTPUT

WORKFLOW: IOT DATA PREPARATION

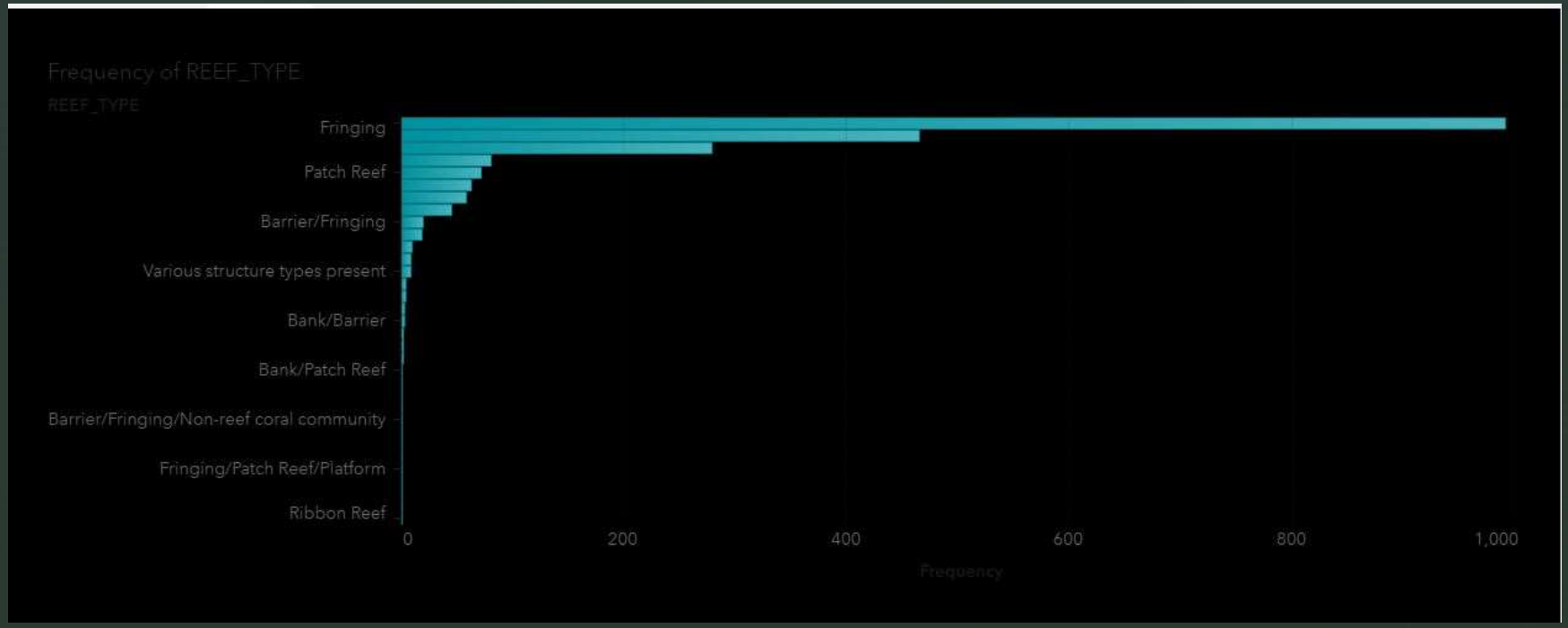




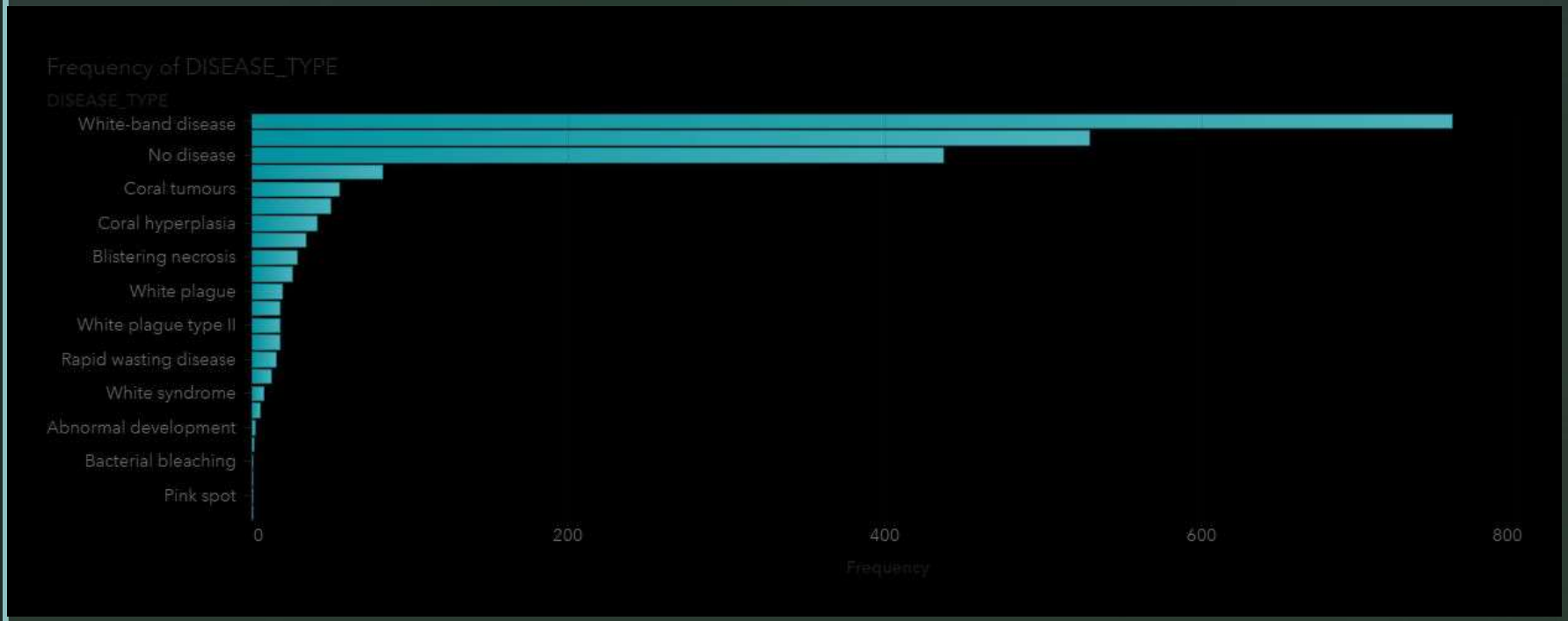
WORKFLOW: SAS VISUAL ANALYTICS



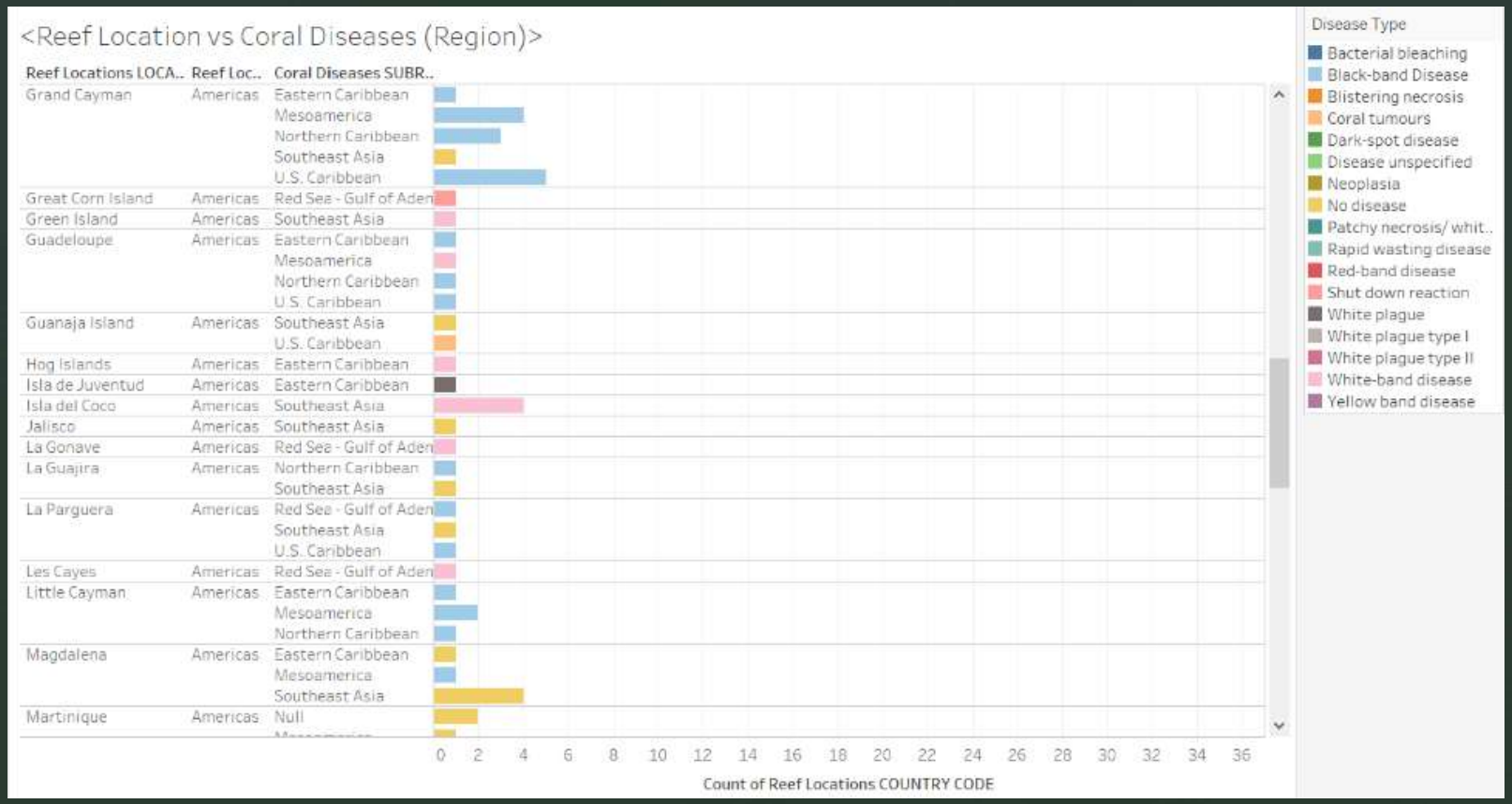
WORKFLOW: SAS VISUAL ANALYTICS



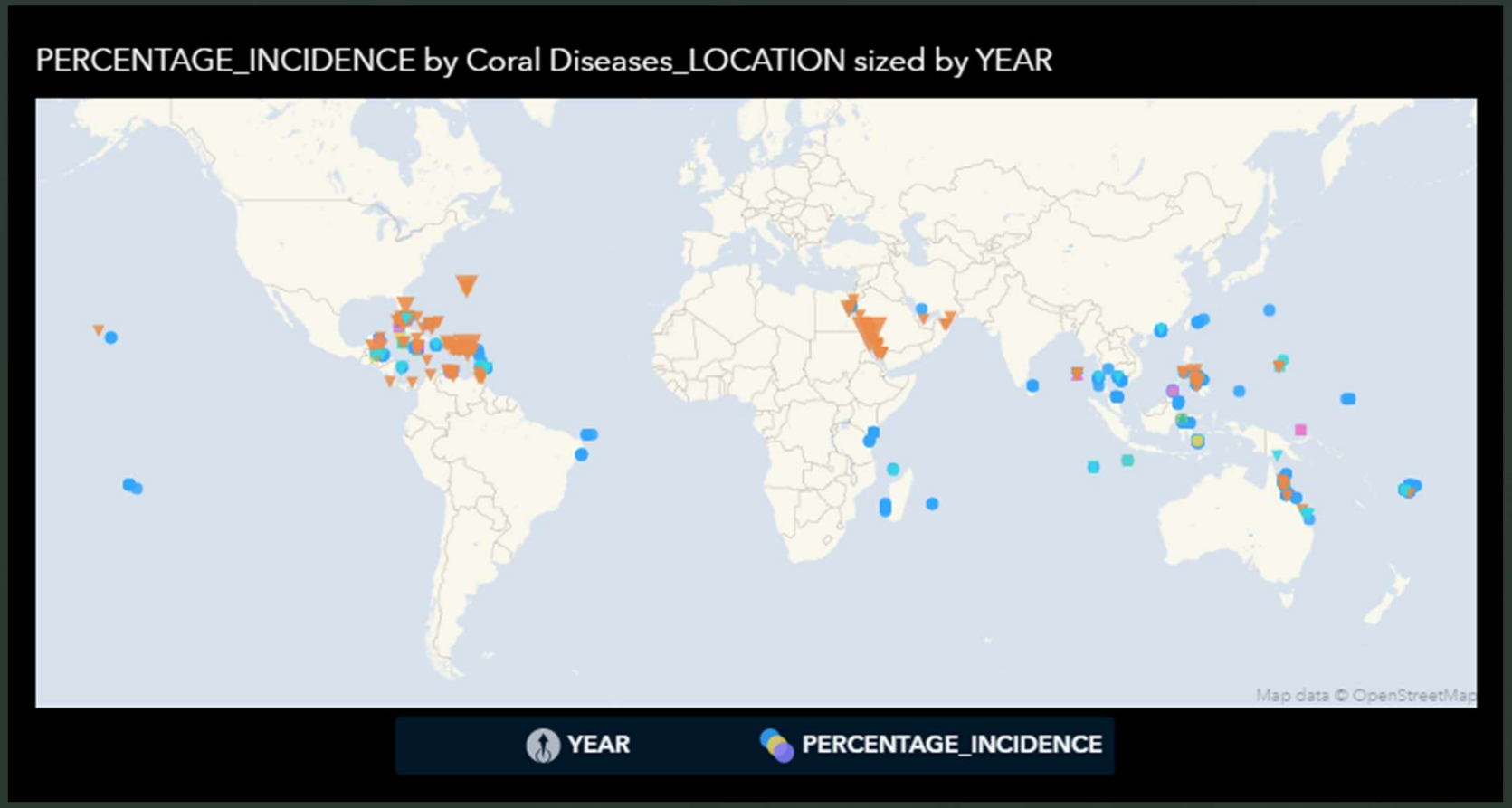
WORKFLOW: SAS VISUAL ANALYTICS



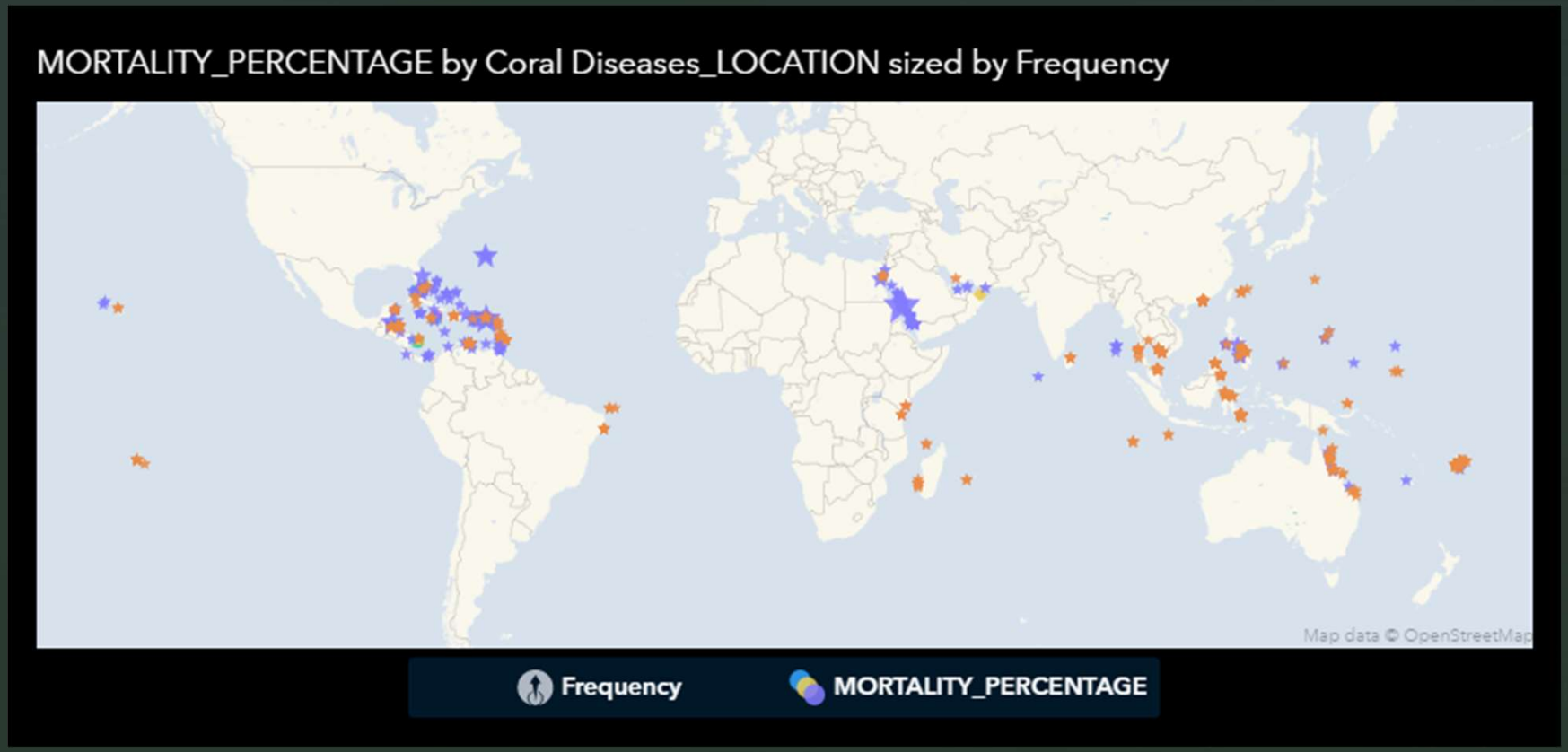
WORKFLOW: ANALYTICS (DISAGGREGATION)



WORKFLOW: SAS VISUAL ANALYTICS (GEOSPATIAL)

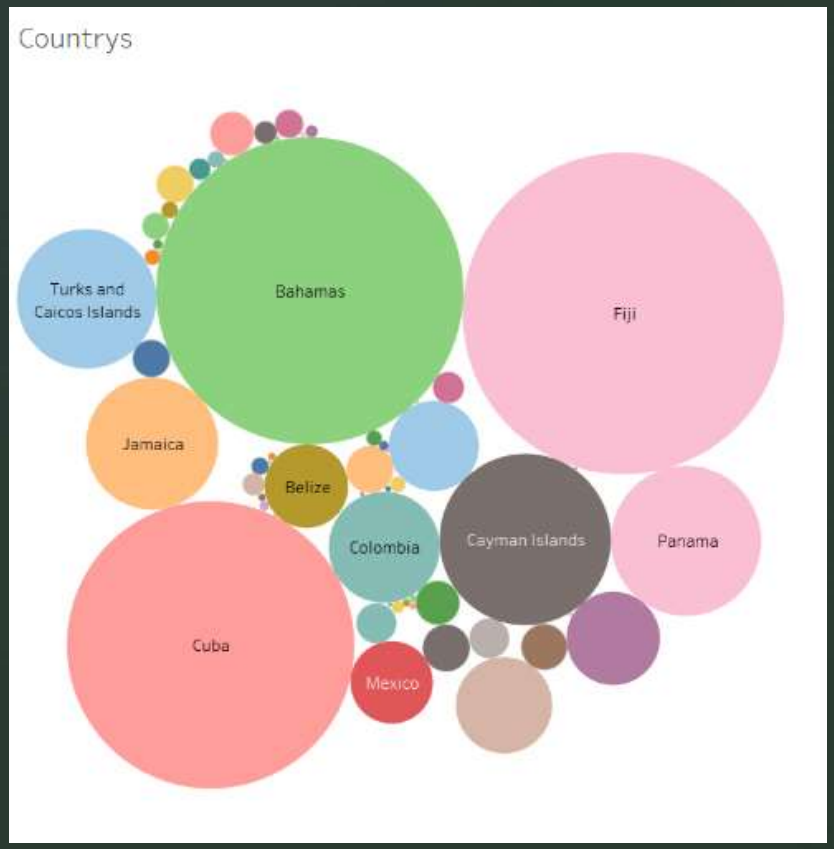


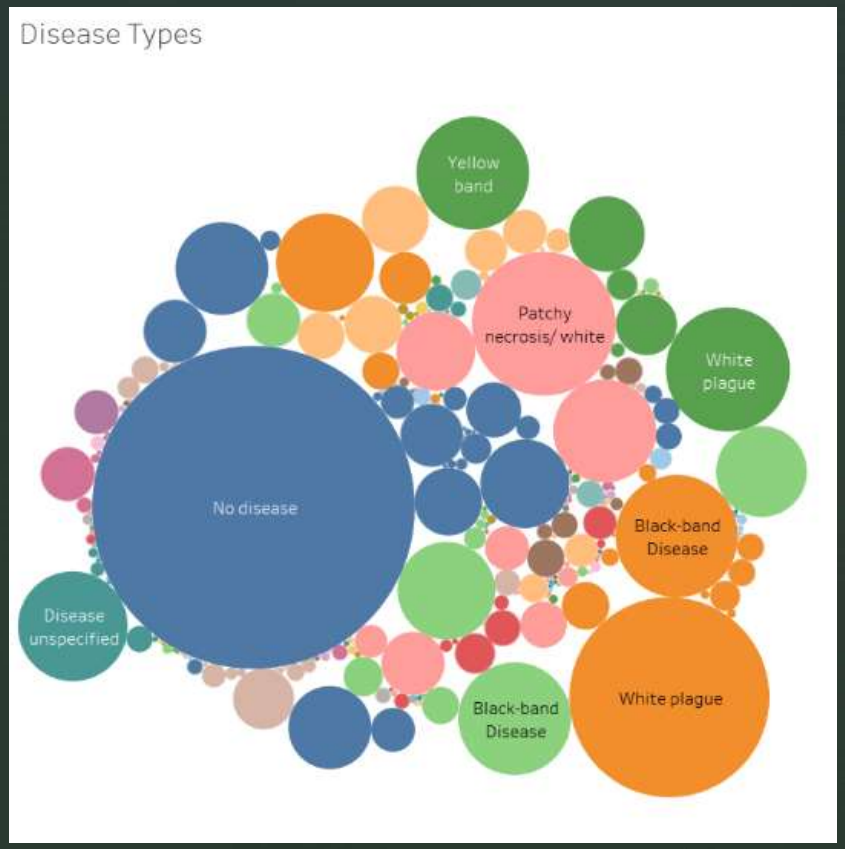
WORKFLOW: SAS VISUAL ANALYTICS (GEOSPATIAL)



WORKFLOW: VISUAL ANALYTICS (GEOSPATIAL)

WORKFLOW: PLATFORM ANALYTICS (FAST 'BIRDS-EYE' INSIGHTS)





WORKFLOW: SAS PLATFORM ANALYTICS (FAST ‘LOCAL’ INSIGHTS)

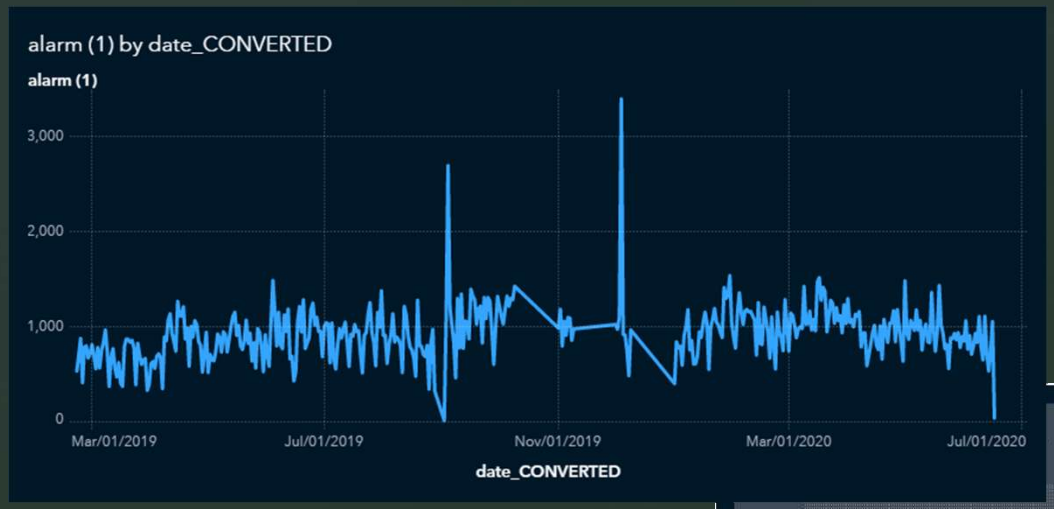
PERCENTAGE_INCIDENCE by Coral Diseases_LOCATION sized by YEAR

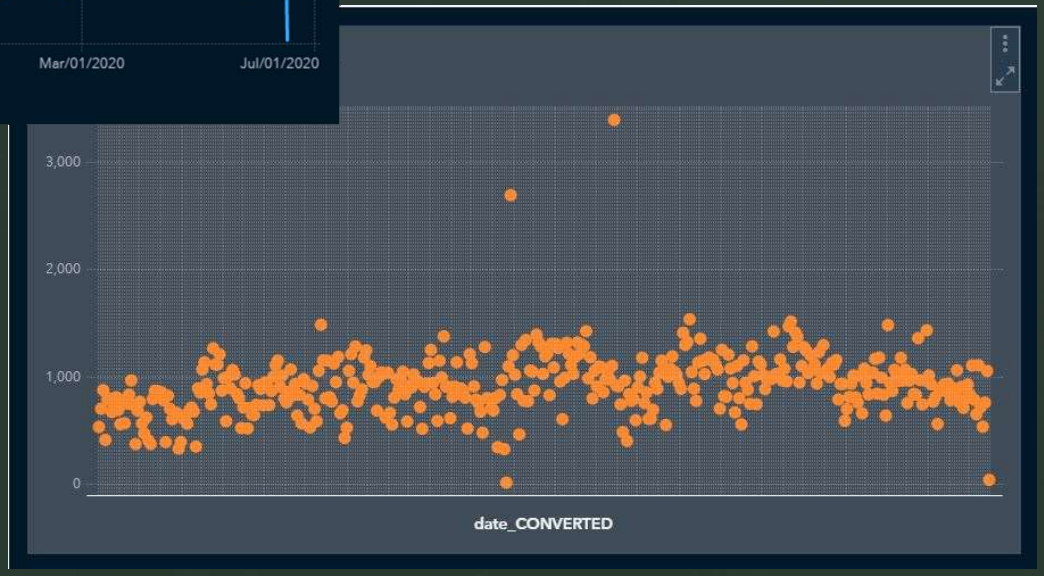
MORTALITY_PERCENTAGE by Coral Diseases_LOCATION sized by Frequency

MORTALITY_PERCENTAGE by Coral Diseases_LOCATION sized by Frequency

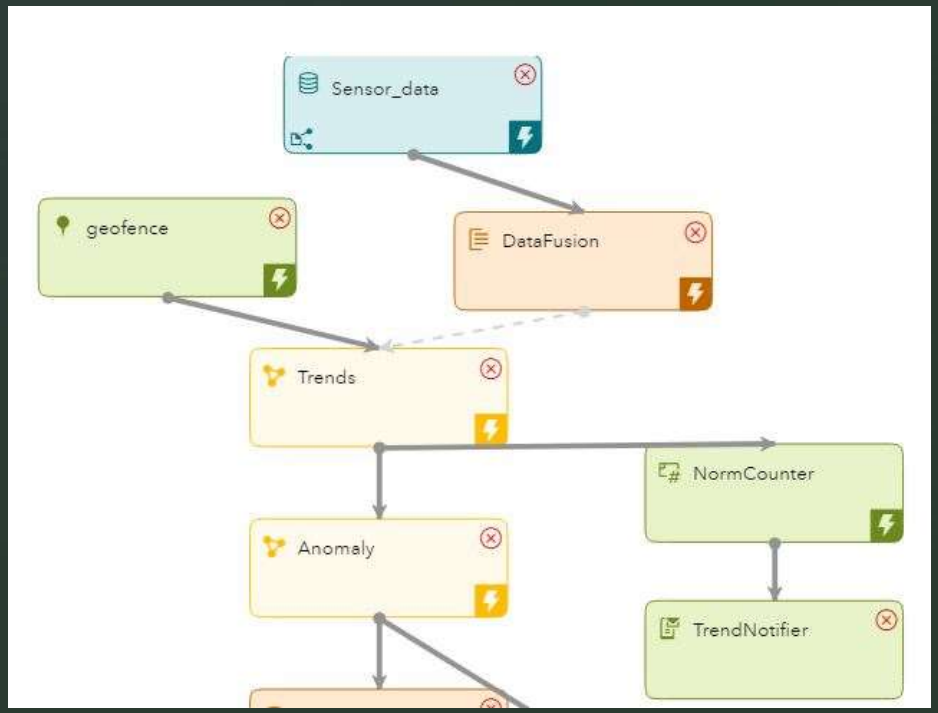
MORTALITY_PERCENTAGE by Coral Diseases_LOCATION sized by Frequency

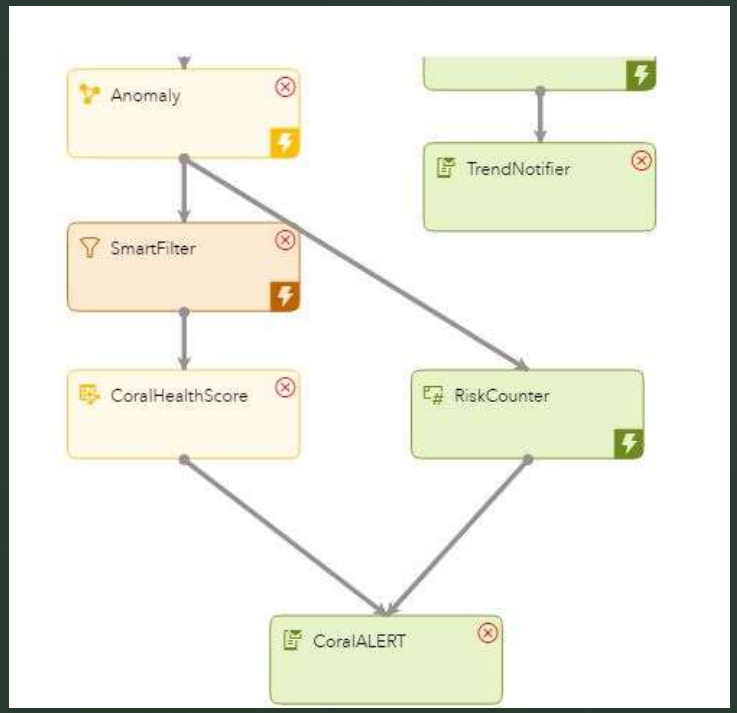
WORKFLOW: SAS IOT/ESP ANOMALY DETECTION (IMPACT)



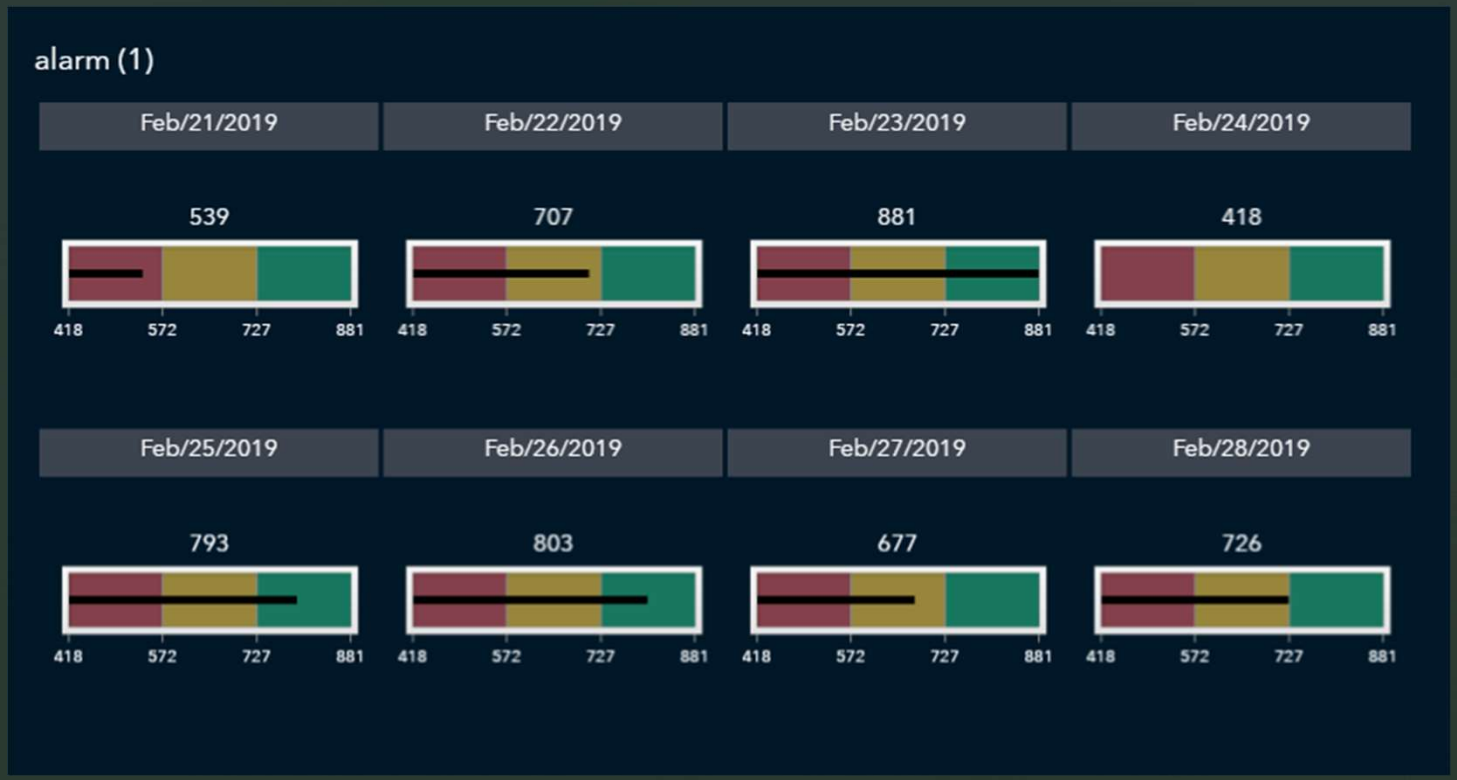


MVP TOOL: IOT DATA + SAS ESP + CUSTOM MODELING





WORKFLOW: SAS ESP RISK MODELING (OUTCOME)



COMMERCIALIZATION POTENTIAL

Gondwana

Desirable

- ✓ Precision
- ✓ Quality with speed
- ✓ Domain expertise
- ✓ Interoperable
- ✓ Simple to Use

Feasible

- ✓ Usable
- ✓ Scalable
- ✓ Portable
- ✓ Iterative
- ✓ Platform Thinking

Viable

- ✓ System Agnostic
- ✓ One-Time Setup
- ✓ Robust / Repeatable
- ✓ Quick to Deploy
- ✓ Plug and Play

CO-FOUNDER TEAM

Gondwana

Faiz Ikramulla

Operations + Engineering

K. Vamshi Mohan

Machine Learning + Data Science

Dipak Sunar

Product Management + Cybersecurity

Andrei Petrou

Business Development + Solutions

SUPPORTING SLIDES

ST. LOUIS GEOSPATIAL COMMUNITY
(just a fragment!)

- Collaboration
- Partnerships
- Solutions Space
- Shared Growth
- Broad Benefit
- Ecosystem Discovery
- New Opportunities!

US Fed Govt

STL Geo Futures

W.E.C. UMSL

Alliance STL

Gondwana

Maryville

Geosaurus

CWTI

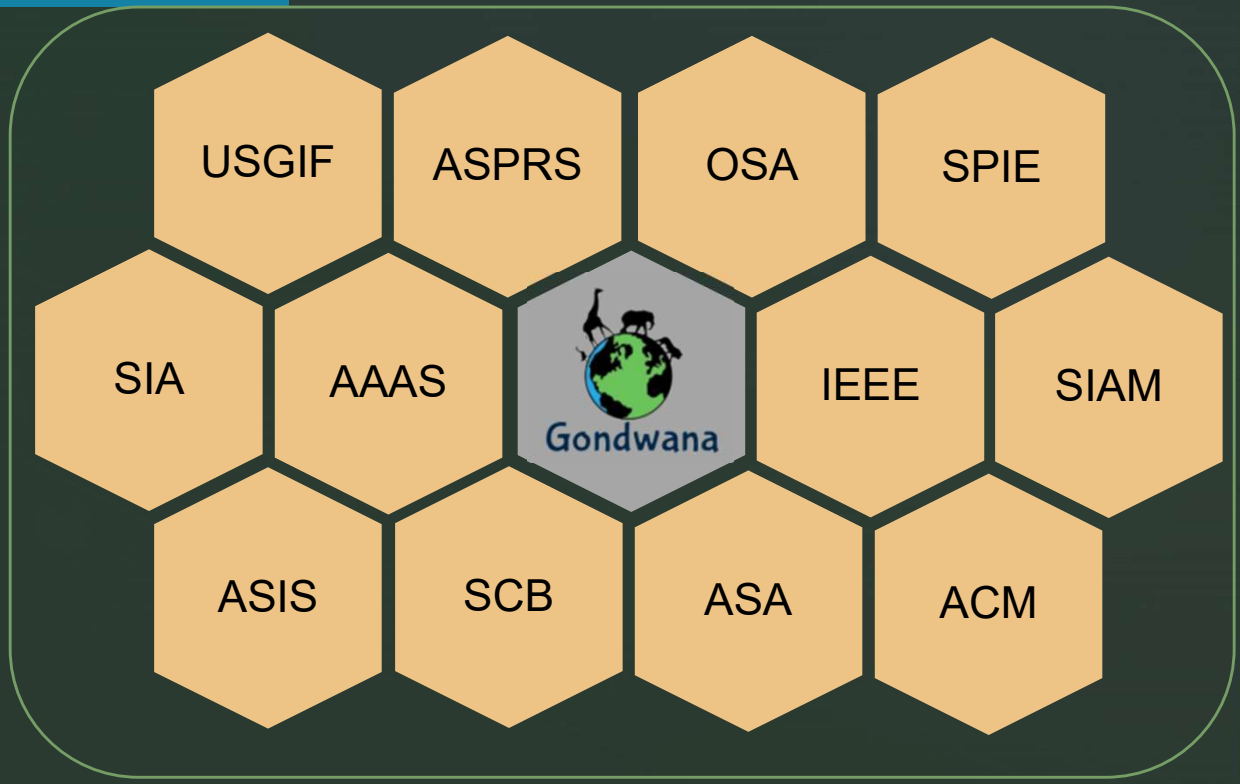
GeoSLU

USGIF SLAWG

ESRI

INDUSTRY ASSOCIATIONS – ECOSYSTEM THINKING!

- Advanced AI/ML
- Applied Statistics
- Industrial Math
- Computing
- Engineering
- Geospatial
- Security
- Ecology



BUSINESS MODEL

Gondwana

Custom ML/AI Tool

Encourage Safe / New Tourism

Eco-Tech Skills Learning

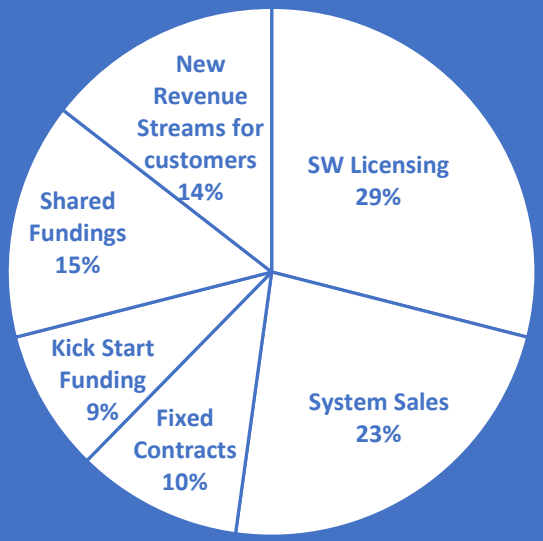
Eco-Tech Jobs Creation

=

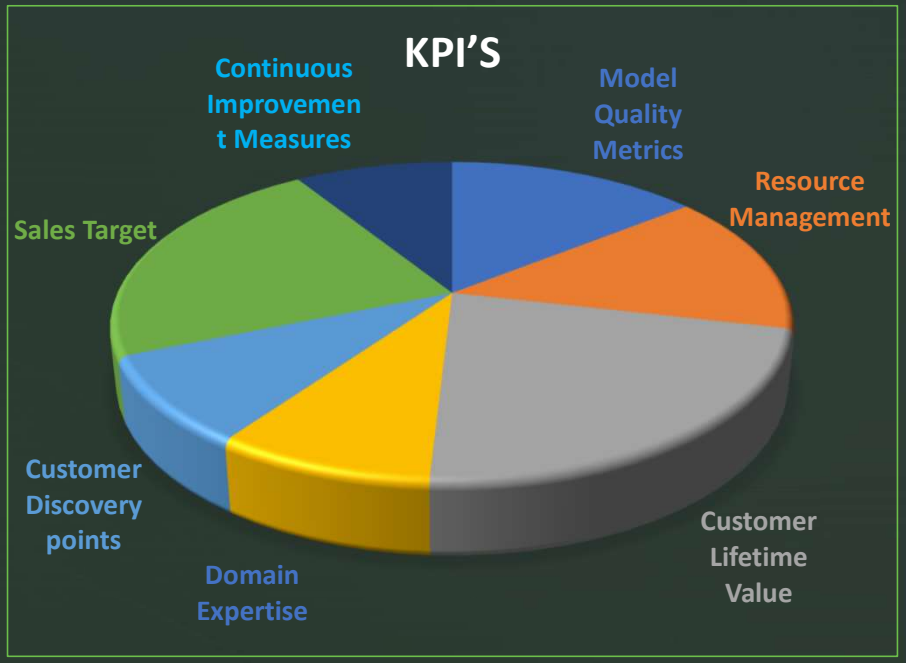
Secured Ecology

FINANCIAL MODEL & ASSUMPTIONS

MONETIZATION



KPI'S



BUSINESS GROWTH PLAN

Gondwana

- Leverage our unique skillset; Partner with STL geospatial & technology communities; On-going customer discovery
- Market Opportunity Identified, Market Segment Determined, and Monetization Plan Forecasted
- Develop for precision, quality, and efficiency; Test with verification & validation metrics, and deploy with continuous improvement.
- Start small; scale smart, fast, and lean – reach new global customers and investment opportunities quickly

OUR PROGRESS

- US Fed/CWTI “Saving The Herd with AI” - Winning Proposal
- Industry Partnership: CWTI (Dr. Odean Serrano)
- University Partnership: Maryville University
- Potential 1st Adopter: Durrell Wildlife Conservation Trust
- Potential Scientific Publication(s)
- Potential University Partnership(s): SLU, UMSL

PROPOSED CUSTOMER PIPELINE

- World Ecology Center (UMSL)
- Missouri Botanical Gardens
- Turtle Survival Alliance
- American Shark Conservancy
- Wildlife Conservation Society
- South Florida Coral Reef Initiative