- ➤ **WELCOME AND OPENING REMARKS**

- ➤ **PURPOSE OF TRAINING**

- ➤ **SUMMARY OF WHAT WILL BE COVERED**

James E. Fischer Jr, P.E.
State Water Resources Control Board/Office of Enforcement/Special Investigations Unit
1001 I Street, 16th Floor Sacramento, CA 95814
November 5th 2014

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- **SSO ENFORCEMENT: SANTA CRUZ COUNTY SANITATION DISTRICT (RB3)**

    - CY 2011: two large SSOs (88K+23K)

    - CY 2014: one additional SSO during settlement (23K for infrastructure failure)

    - Adopted **Order R3-2014-0038** ($276k + ECA to support sewage storage tank)

CLEANUP AND COOPERATION

- SCORE = 1.1

    1. District failed to provide adequate details and supporting technical information as required in NOV/13267 letter for the SSO volume determination, including "engineering methods, diagrams, models, references, calculations and assumptions used."

    2. District did not voluntarily cooperate in returning to compliance and correct environmental damage as follows:
        a. Procedures specified in District's SSMP not implemented for sewage recovery.
        b. Procedures specified in District's SSMP not implemented for sampling/monitoring.
        c. Procedures specified in District's SSMP not implemented for taking photographs.

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- **DISTRICT'S RESPONSE TO ENFORCEMENT ACTION**
  - o Improve Engineering and Operations communications and "real time" data access for:
    - Closed-Circuit Television (CCTV) historic inspection records, grading and videos
    - Sewer mapping/GIS data
    - Computerized Maintenance Management System (CMMS) records
    - Capital Improvement Projects
    - SSO historic spills and information

Wastewater Networks

Maintenance and Management Best Practices

Special Presentation To the California State Waterboards Showcasing Santa

**Cruz County SD and t4Spatial's Underground Application**

Ed Richards
President/CEO, t4 Spatial
November 5th 2014

– Over one million miles (> 5B feet) of wastewater networks in U.S. Average age: 70 years. "Out of sight, out of mind."

–Traditional reactive maintenance: solving daily catastrophes and fixing broken systems

- Critical risks: impact of wastewater systems failures on water ecosystem and environment

–Stringent compliance mandates and increasingly tight budgets call for new proactive approach

**The Problem:
Sewer System Overflows**
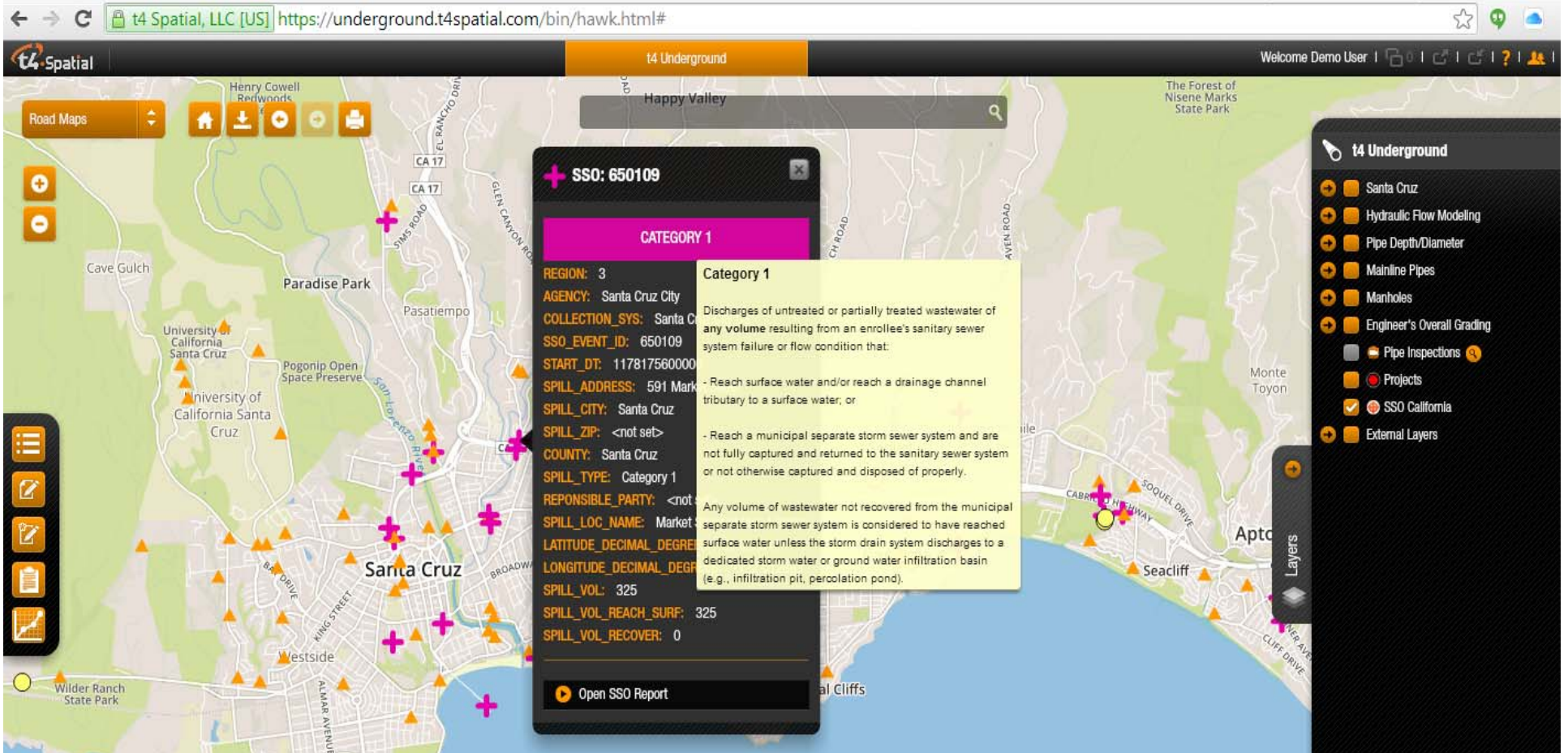
Santa Cruz County Sanitary Sewer Overflows (SSO) – Seven Year History

The Challenge

– Understand defects and failures and identify potential failures

- What: *the failure or defect is?*
- When: *did it or will it occur?*
- Where : *exactly in my network is the failure or defect?*
- Why: *did this failure occur*
- How: *can we mitigate damages?*

– Need analytics engines

- Statistical and predictive warnings and notifications

– Implement best practices

- People, process, standards and technology

Proactive Wastewater Management: a Delicate Balance

Social
Enhanced quality of life for citizens

Environmental
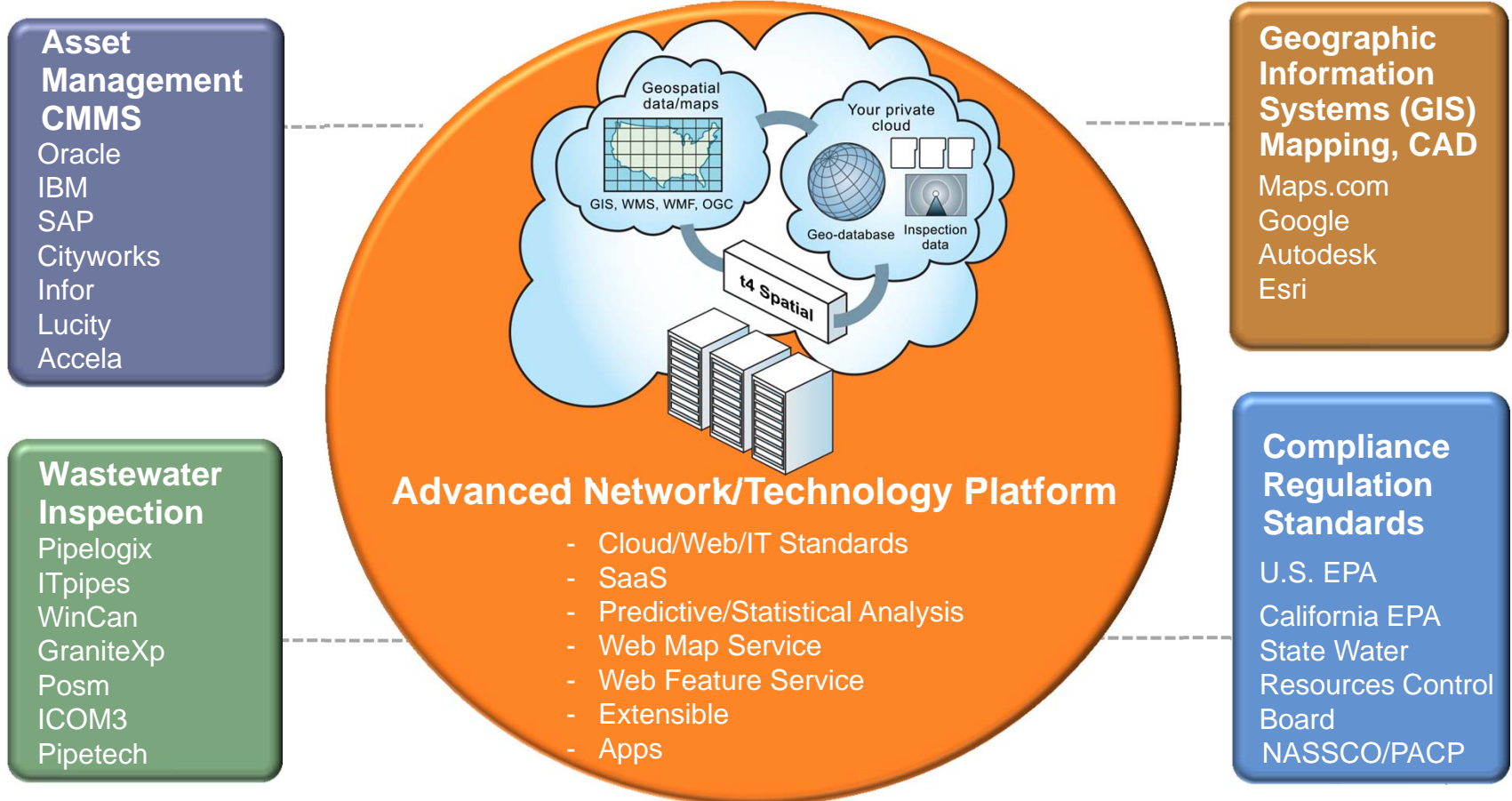Protecting the world for future generations

Economic
Continuous prosperity. Job and business growth

- SUSTAINABILITY SERVICES DELIVERED BY TECHNOLOGY

Unified Data Visualization Platform

- A new platform that integrates data from multiple silos and provides universal accessibility
- Secure, universal access to Data
- Anytime, Anyplace, with Any Device

Asset Management CMMS
Oracle
IBM
SAP
Cityworks
Infor
Lucity
Accela

Geographic Information Systems (GIS) Mapping, CAD
Maps.com
Google
Autodesk
Esri

Wastewater Inspection
Pipelogix
ITpipes
WinCan
GraniteXp
Posm
ICOM3
Pipetech

Compliance Regulation Standards
U.S. EPA
California EPA
State Water Resources Control Board
NASSCO/PACP

Geospatial data/maps

GIS, WMS, WMF, OGC

Your private cloud

Geo-database   Inspection data

t4 Spatial

Advanced Network/Technology Platform

- Cloud/Web/IT Standards
- SaaS
- Predictive/Statistical Analysis
- Web Map Service
- Web Feature Service
- Extensible
- Apps

California Water Boards

Protecting

Water Boards

Sanitary Sew

Annu

STATE WATER RESOURCES CONTROL BOARD
ORDER NO. 2006-0003-DWQ

STATEWIDE SEWER SYSTEM DISCHARGE REQUIREMENTS

SYSTEMS

referred to as "State

ies, districts, and other public
s greater than one mile in
ally treated wastewater to a
fornia are required to comply
inafter referred to as

m sanitary sewer systems of
mercial wastewater,
erved by the sanitary sewer
led solids, pathogenic
nding organic compounds, oil
a public nuisance,
harged to areas with high
used for drinking, fishing, or
e or ground waters, threaten
public health, adversely affect aquatic life, and impair the recreational use and
aesthetic enjoyment of surface waters.

3. Sanitary sewer systems experience periodic failures resulting in discharges that
may affect waters of the state. There are many factors (including factors related

NASSCO, INC

Benefits of Pipeline Assessment and Certification Program

- Better data and more efficient operations
- Creates opportunities to better understand sewer system condition and deterioration
- More efficient estimation and bidding
- Sets the stage for deterioration modeling, decision matrix, PM scheduling

Better preventative maintenance decisions and fewer SSOs

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t4·Spatial Underground

Tomorrow

Gap Analysis

Today

Where Does Your District Fit ?

Videos on VHS Paper Records	Videos on DVD/Hard Drive Spreadsheets	Central Server Software to View and Report	Integration to GIS	Condition level filtering and planning	Remotely accessible to the Field and outside consultants

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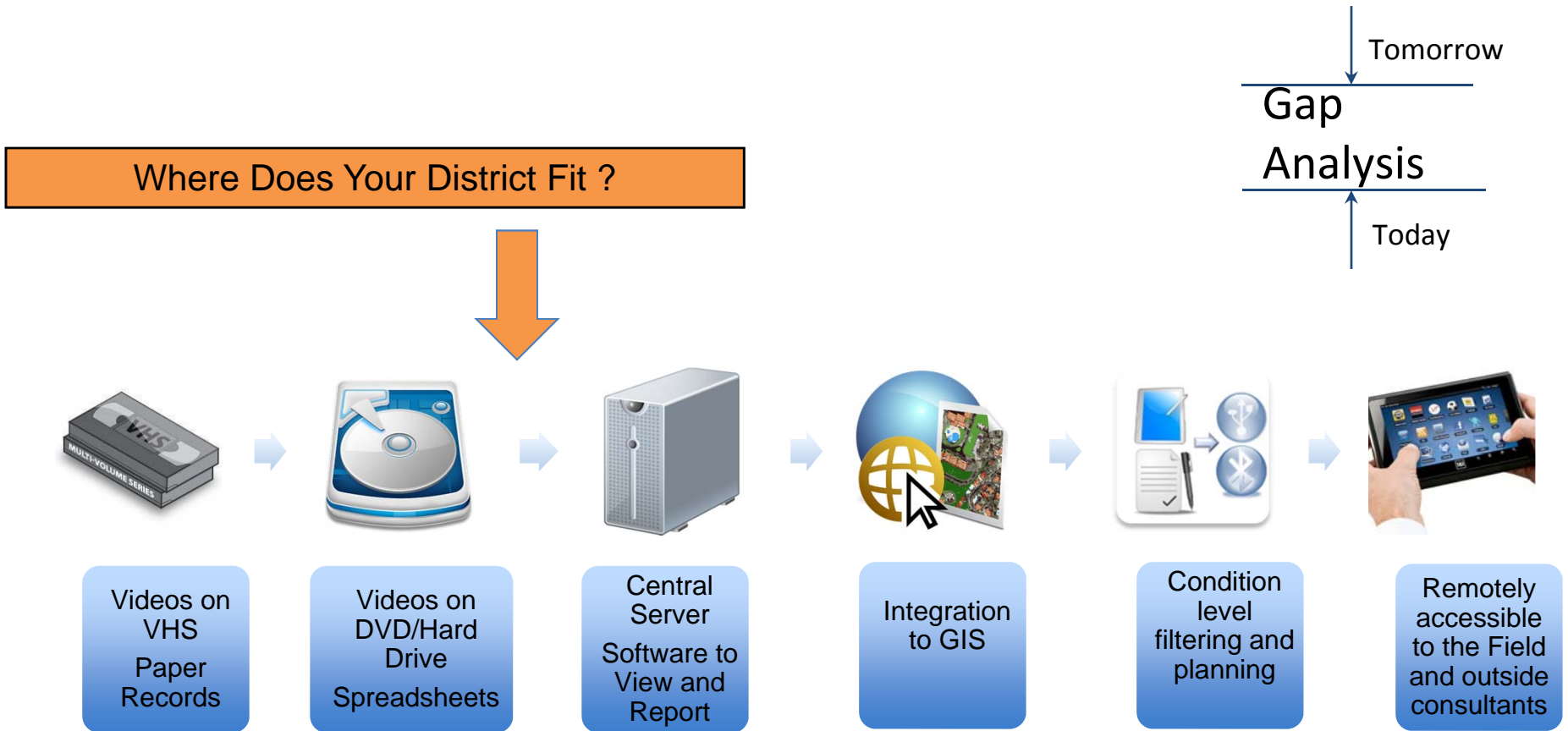
A Single Integrated & Extensible Solution

t4·Spatial Underground

The new way to do your work!

✓ Asset Maintenance Records	Cloud Server Software to View, Analyze & Report	Integration to GIS Geo Spatial Centric	Condition level filtering and planning Analytics	Remotely accessible to the Field and outside consultants
✓ Inspection Data				
✓ GIS Data				
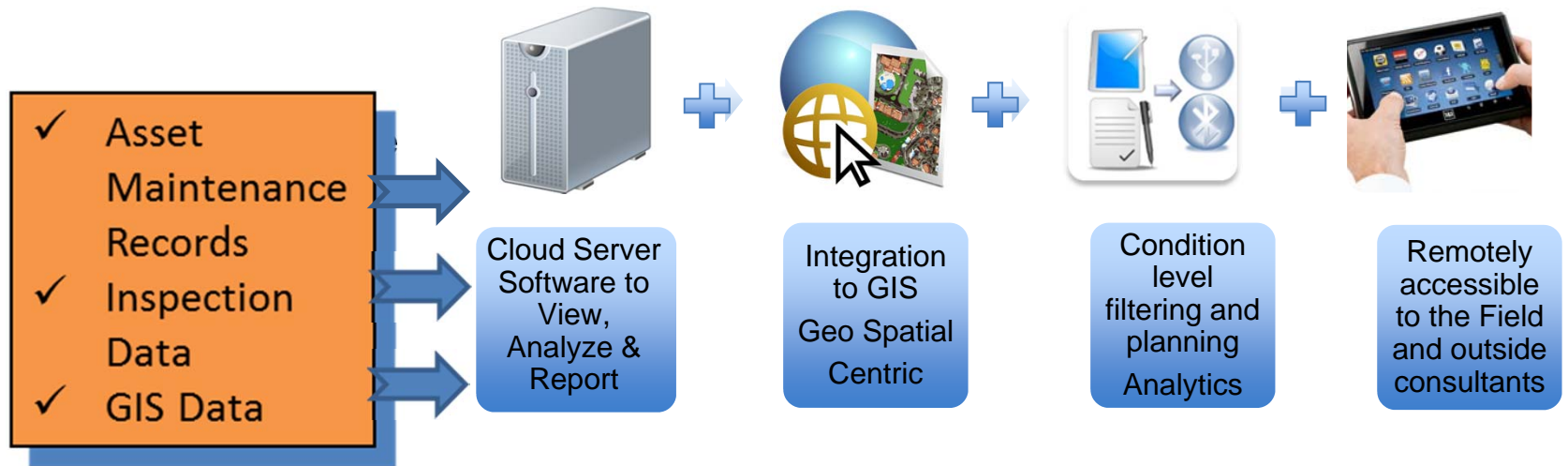
**Secure, universal access to Data
Anytime, Anyplace, Any Device**

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IT-Based Cloud Architecture Delivering Value to ALL the Key Stakeholders

# Case-Study: Santa Cruz County Sanitation District
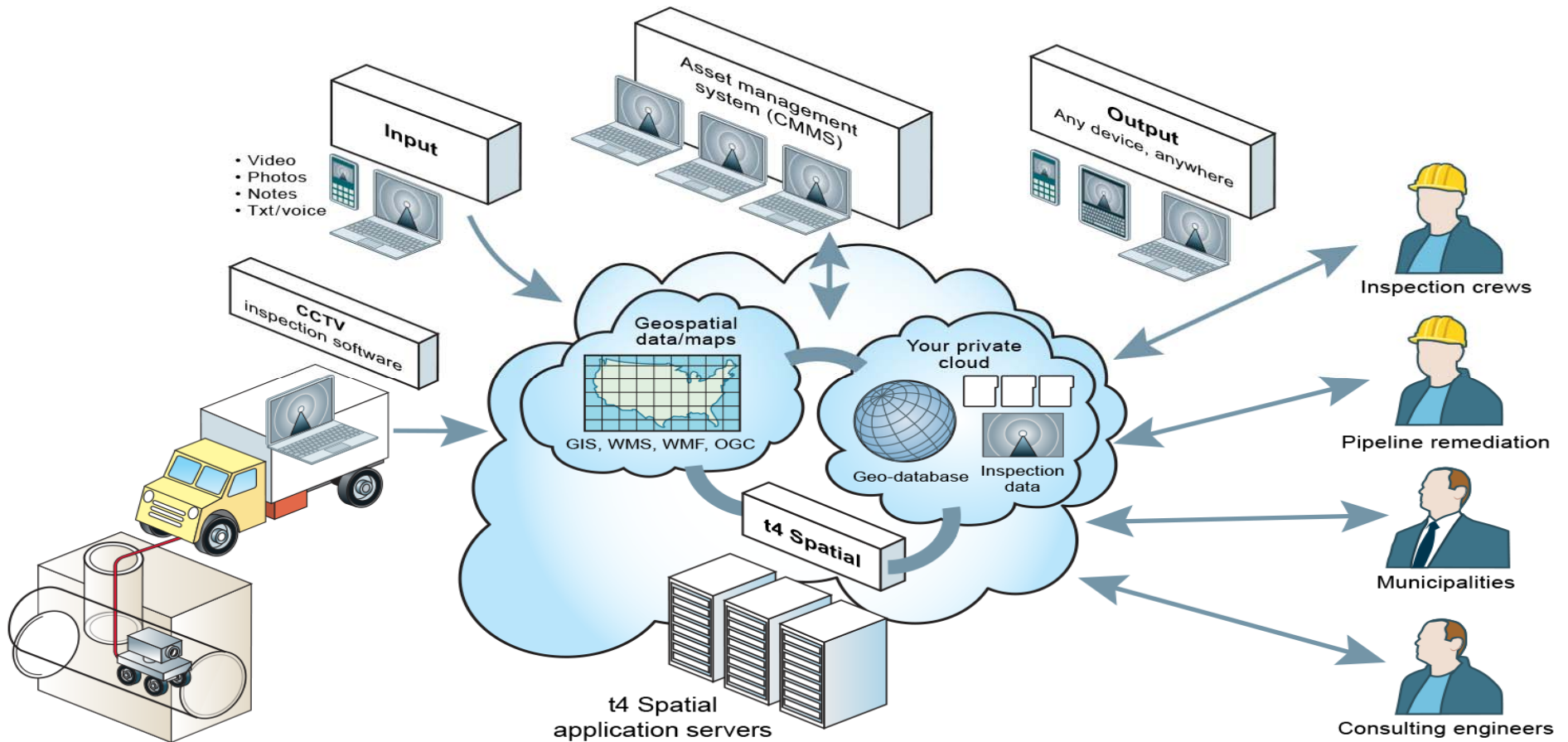
Challenge:

- Recovering from major overflow and negotiating penalty with state water boards

- Requirement to simplify work flows and provide data/reports to water boards

- Looking to change the perception of industry & help county administration understand the importance of preventative wastewater management and the "out-of-sight"/"out-of-mind" assets

- Working through department structures -> e.g. GIS data stored and maintained under a different department (IT), not operations

Background:

- SCCSD includes 180 miles of collection systems, 20 miles of forced main, 36 pumps stations

- Information has been scattered and not available (GIS information, physical maps, inspections ,videos and line cleaning/pump maintenance information)
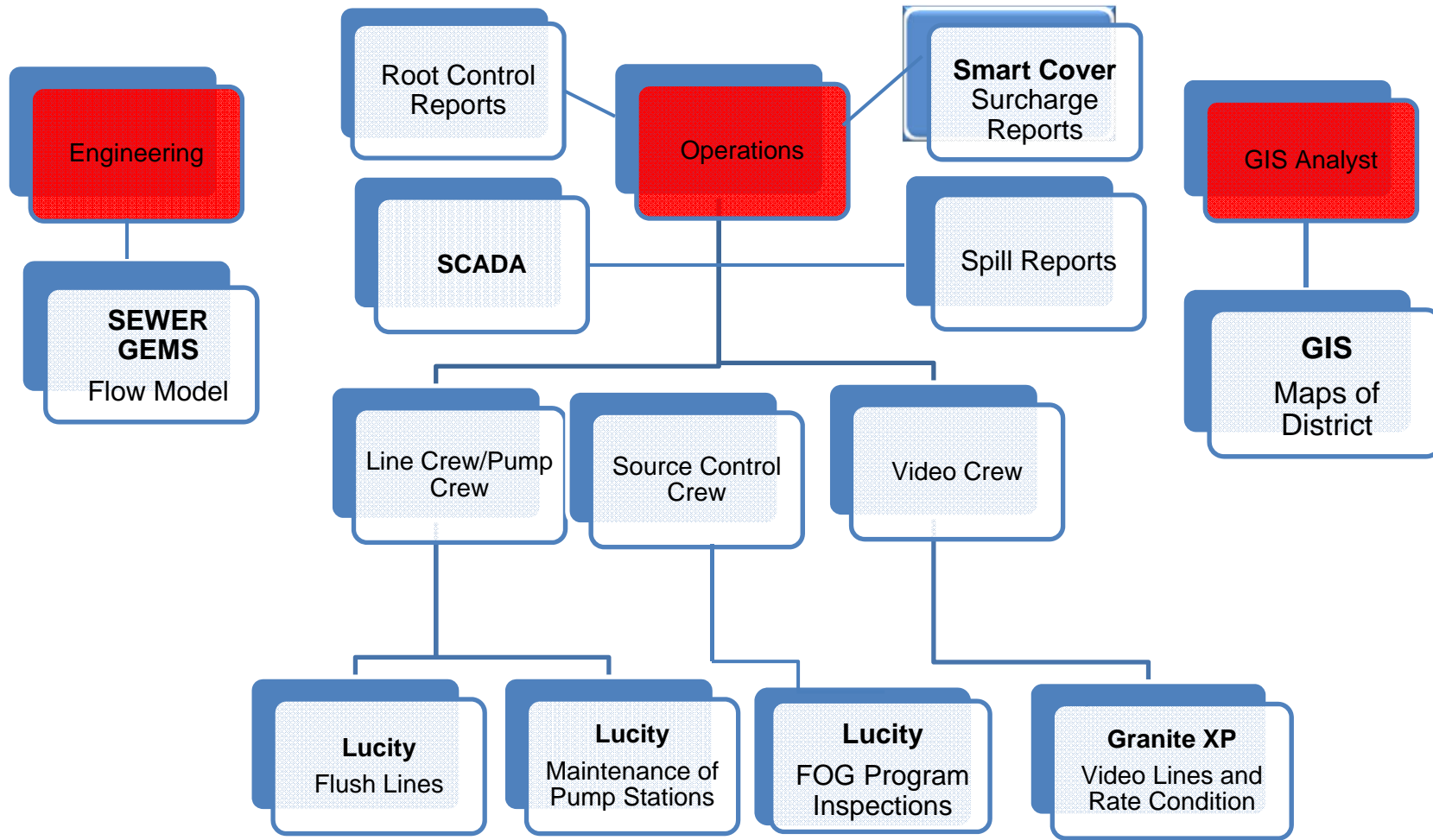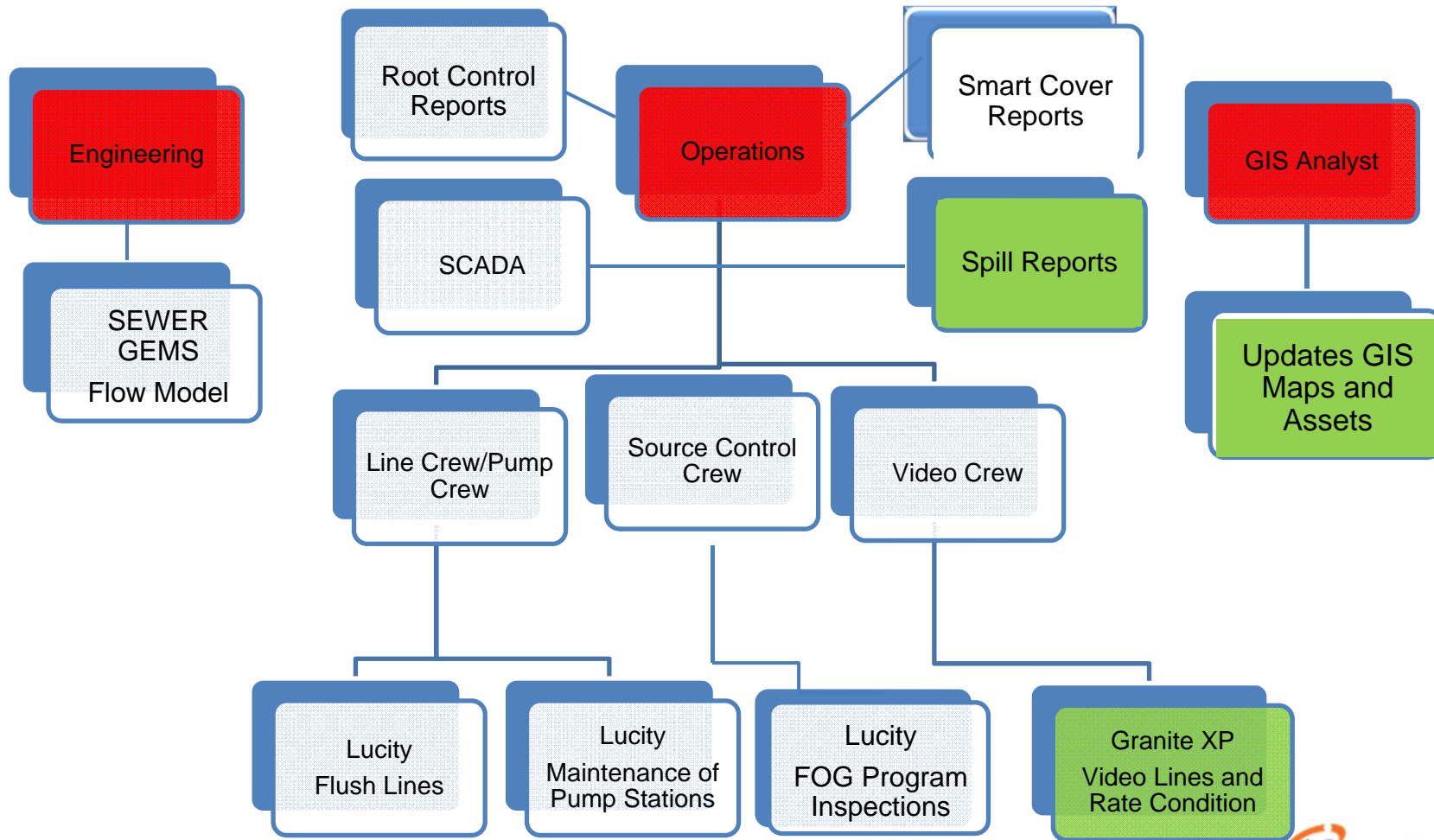
Why and How the Information is Used

- Design Improvements
- Verify that Maintenance Activities and Documented and Reasonable (30 day flush, etc.)
- Required Reporting
- Point repairs/lining vs. full replacement
- Respond to State Inquiries/Violations
- Audit and Update Sanitary Sewer Management Plan (SSMP)

Information Collected, Unified and Visualized in t4 Underground

▪ Phase 1 Complete - Green

Engineering

SEWER GEMS
Flow Model

Root Control Reports

Operations

Smart Cover Reports

SCADA

Spill Reports

GIS Analyst

Updates GIS Maps and Assets

Line Crew/Pump Crew

Source Control Crew

Video Crew

Lucity
Flush Lines

Lucity
Maintenance of Pump Stations

Lucity
FOG Program Inspections

Granite XP
Video Lines and Rate Condition

Next Information Collected, Unified and Visualized in t4 Underground

- Phase 2 In-Process - Green

Engineering	Root Control Reports — Operations — Smart Cover Reports and Locations
SEWER GEMS Flow Model	SCADA — Spill Reports
	Line Crew/Pump Crew — Source Control Crew — Video Crew
	Lucity Flush Lines — Lucity Maintenance of Pump Stations — Lucity FOG Program Inspections — Granite XP Video Lines and Rate Condition
GIS Analyst	
Updates GIS Maps of District	
Drainage Inlet Locations	

District Goals

- To enter the next phase of CIP analyses with all field and engineering data in an easy to access location

- Be able to provide supporting documentation to State in a short amount of time

- Perform SSMP Audits and Evaluate Performance Measures in a Timely Manner

- Have a global view of District achievements and areas that need work

Solution Benefits

- OPEX reduction through consolidation of data and data aggregation for reporting requirements

- Risk reduction and better protection against non-compliance

- 97% increase in productivity (without t4 it takes 3 months to pull required reports for water boards, with t4 it takes 3 days)

- No CAPEX required (Software-as-a-service SaaS model)

- Visibility of "out-of-sight"/"out-of-mind" assets to upper management, visualization improves perceptions

- Facilitates data exchange, breaking inter-department barriers

Foundational Best Practices For Preventative Maintenance & Management Analysis

Unlock the value of processes you're already doing, and do more, with all your Data Integrated on a Map…in one place, available securely anytime, anywhere with any browser

- ❖ **Proactive Maintenance:** *Know what, when and where work has to be done and get ahead of problems before they become crisis. See the big picture and manage failure risk. Mitigate potential SSO's (Sanitary Sewer Overflows) before they occur.*

- ❖ **Secure Collaboration:** *Share information in the cloud. Security limits access to authorized stakeholders*

- ❖ **Reduced Maintenance Cost:** *Prioritize and target problem areas based on real insight*

- ❖ **Regulatory Compliance:** *Present your inspection and remediation plan and show proof at each step*

- ❖ **Emergency Response:** *Real-time access to sewer provides help in the field*

- ❖ **Contract Management:** *Share videos of selected areas for bidding and monitor progress; provide better data to outside engineers for planning remedial projects within budget*

- ❖ **Community Relations:** *Better communication with and service to your customers*

- ❖ **Workflow Process Optimization:** *Make better use of existing time & resources*

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Q&A

t4 Underground Smart Phone/Tablet Collector "App"

❑ ACTIVITIES EXAMPLE : For "Cleaning and Flushing" maintenance crews in the field use their smart phones /tablets--- via GPS smart phones knows location with a few meters , t4 app looks up and discovers from t4 all assets (ie pipes and manholes) with in adjustable radius , selects pipe segment (PSR) being cleaned, assigns crew name , truck number , date , hours of work and clicks "submit PSR clean" tab . The updated record is immediately pushed to the t4 Underground servers and instantly changes the GIS PSR asset as viewed in t4 Underground from "brown" (not cleaned) to "blue" (cleaned) and stores all the associated data records for future queries analytics and reporting (ie the t4 Spatial geo spatial work engine)

❑ EVENTS EXAMPLE: For "SSO" – responding crews to a spill event use their smart phones/tablets --- via GPS the smart phone knows location (within a couple of meters) –log into t4 Spatial Underground collector APP complete capture of event details in accordance with Waterboards and CIWQS requirements. Hit "submit" –SSO and its details instantly appears in t4 Underground. Data is cached, stored for future queries analytics and reporting (ie the t4 Spatial geo spatial work engine)

Ed Richards is the President/CEO of t4 Spatial, a Santa Barbara based company which provides GIS and cloud-based software solutions using today's proven internet and networking technology to make wastewater data searchable, visible and actionable in ways never before possible, without capital expense. t4 Spatial's t4 Underground software provides applications providing a decision-making platform that extends the life of assets, improves delivery, streamlines maintenance, facilitates regulatory compliance, and reduces costs at every level. Mr. Richards is a mechanical environmental engineer, and graduated from Cal Poly SLO. As an entrepreneur, he has over 25 years of leadership in the Mechanical, Engineering and Infrastructure Construction industries. Over the past 14 years, Mr. Richards has focused on the transformation of these industries by focusing on the convergence with the IT/Internet Technology industry. Mr. Richards is the former President/CEO and founder of Richards-Zeta Building Intelligence, Inc. (RZ), acquired by Cisco Systems in January 2009. Mr. Richards' passion, energy and vision is keenly focused on helping advance these mature yet technology starved industries by leveraging advanced technology, IP networks and internet services to enable environmental sustainability and much needed, yet lagging, work flow process efficiencies.