Facility Informatics with GeoVisipedia

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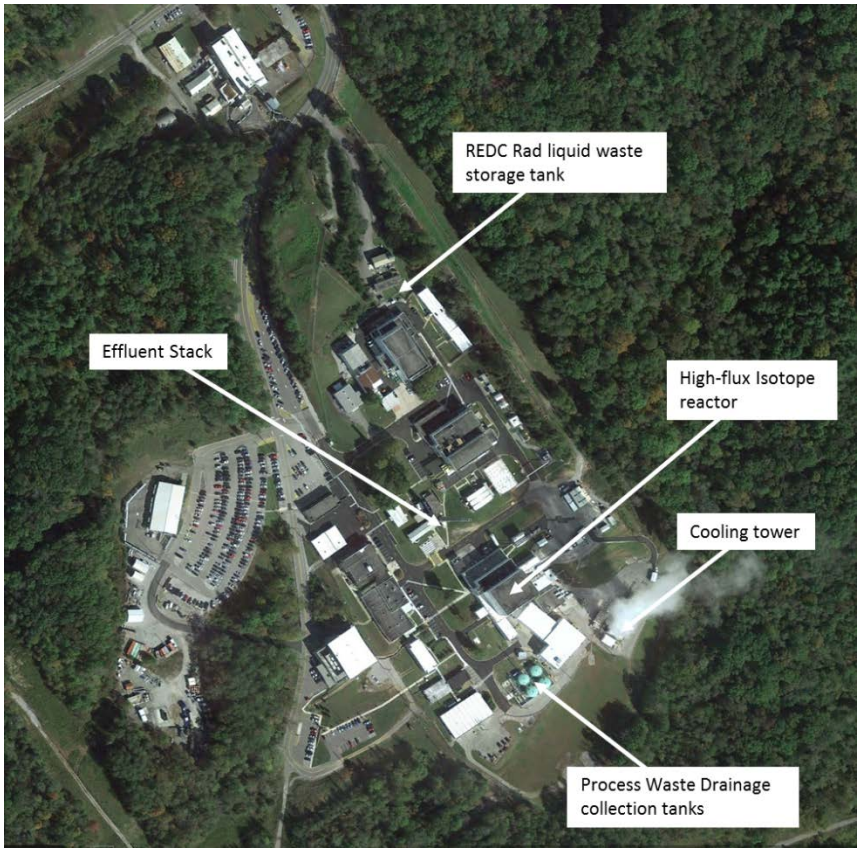
The BIG picture

What is GeoVispedia?

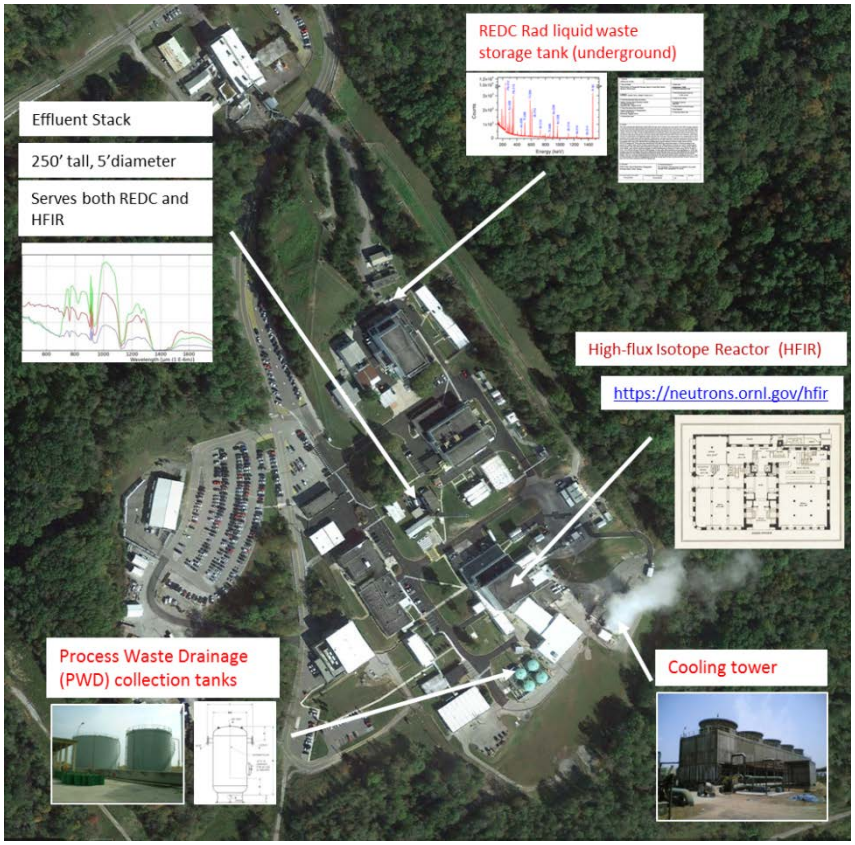
Why is GeoVisipedia useful?

Why is GeoVisipedia important?

GeoVisipedia is a methodology and a toolset

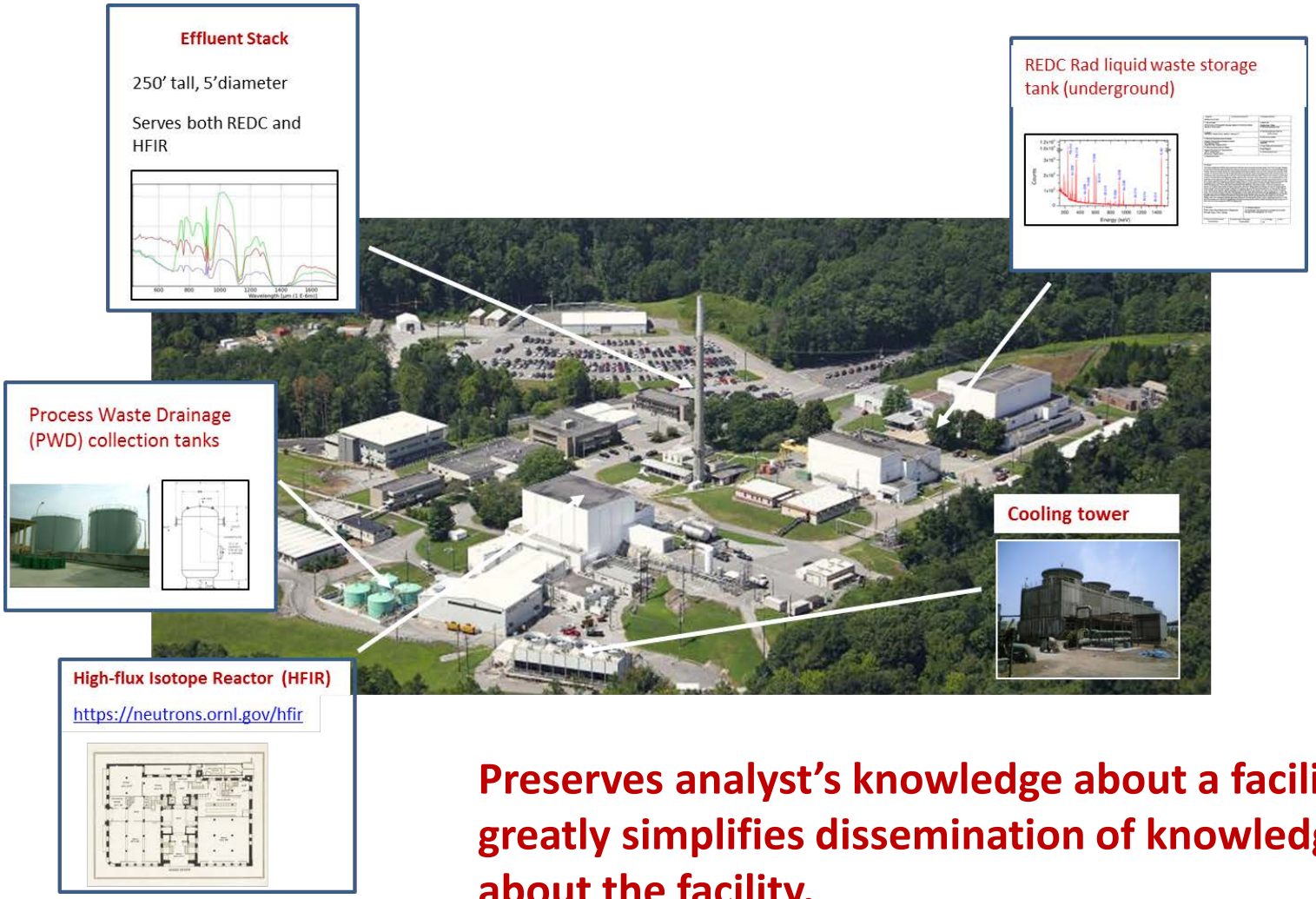


Conventionally annotated image is static —its knowledge content does not change



Imagery annotated with GeoVisipedia is dynamic, constantly updating—imagery becomes a portal to knowledge and insight

GeoVisipedia *automatically* propagates existing annotations to new satellite imagery of facility, regardless of view angle

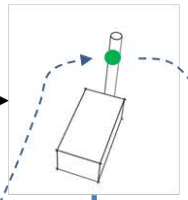


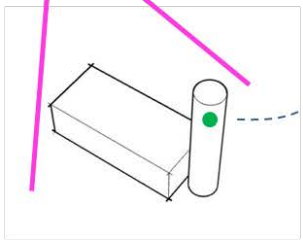
Preserves analyst's knowledge about a facility, greatly simplifies dissemination of knowledge about the facility.

GeoVisipedia exploits a 3D facility model to project annotations to any viewpoint

Satellite position and orientation data used to position virtual camera onto 3D site model

Rendered image of 3D site model



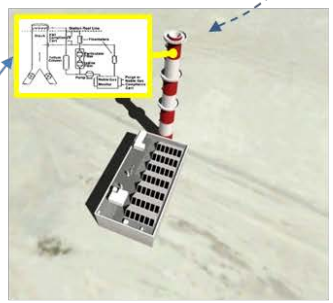


Project annotations from 3D site model onto 2D satellite image

Real world facility

Annotations derived from a data structure containing :

- Coordinates of annotation on 3D model
- Unique index for annotation
- Annotation
  - Notes
  - Diagrams
  - Pictures
  - Links to other information
- Metadata for annotation

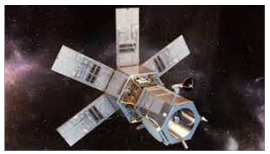


Annotated Image

Mouse-over stack to view annotation

GeoVisipedia is a Visual Wikipedia

Decision-makers:
Easy to learn about a facility and query SMEs— Satellite imagery is the interface to knowledge



GeoVisipedia

- Satellite imagery automatically annotated, regardless of view angle
- Computer assisted knowledge elicitation
- Crowdsource questions to community

Subject Matter Experts

Crowdsourcing

Analysts:
Densely interconnected knowledge with other analysts enables insight into a facility's purpose and operations

A Quick Review

What is GeoVispedia?

A visual wikipedia for satellite imagery. It is a toolset and methodology that greatly enhances analyst's effectiveness

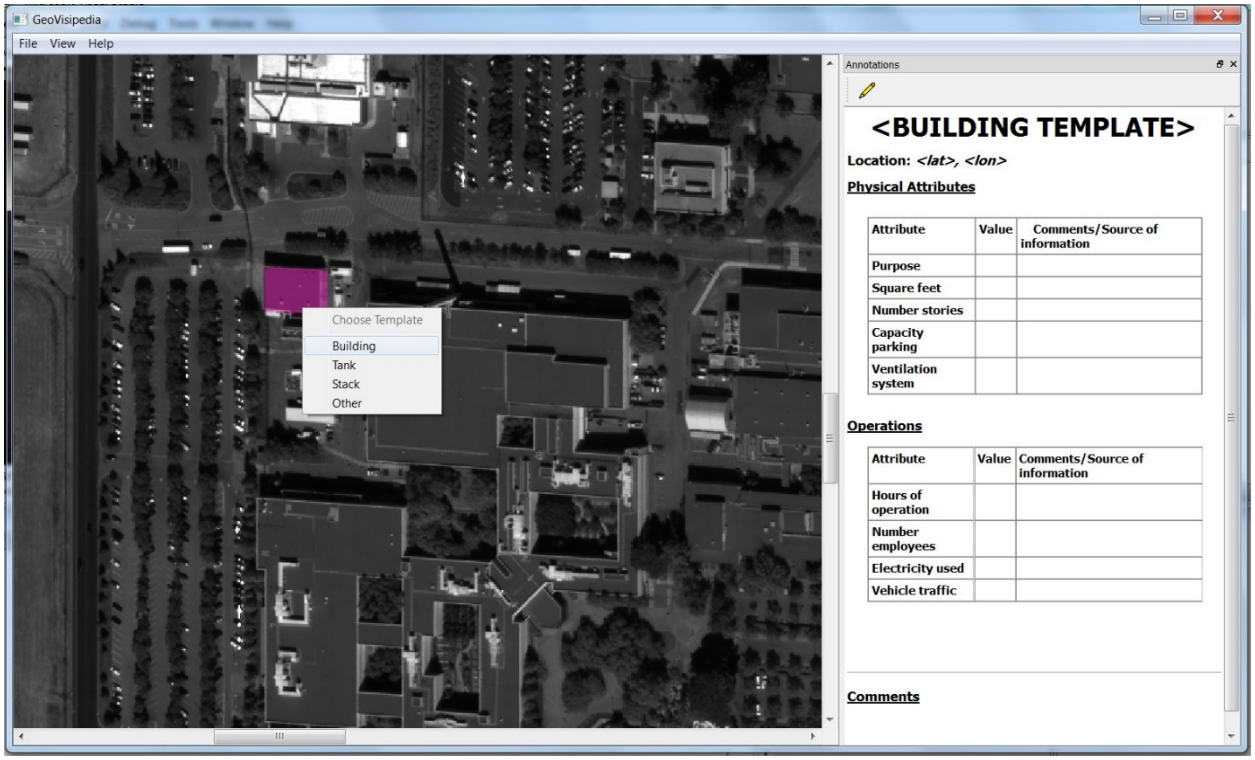
Why is GeoVisipedia useful?

Annotations are automatically propagated to new (or old) imagery of a facility. *Annotate once, annotated forever*

Why is GeoVisipedia important?

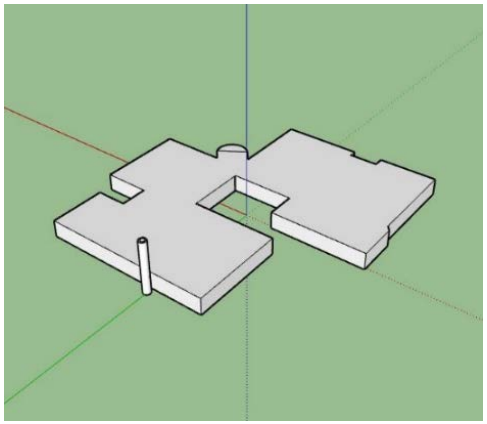
It preserves analyst's knowledge about a facility, and greatly simplifies dissemination of knowledge about the facility

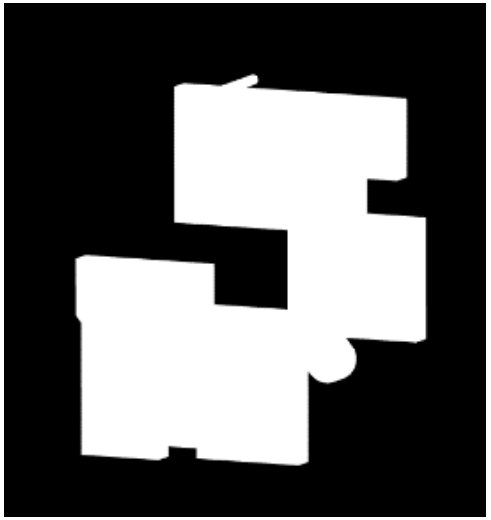
A GeoVisipedia prototype is under development

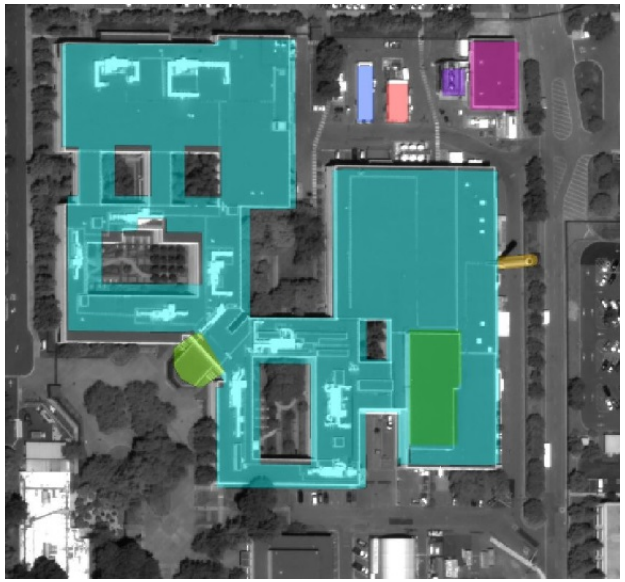


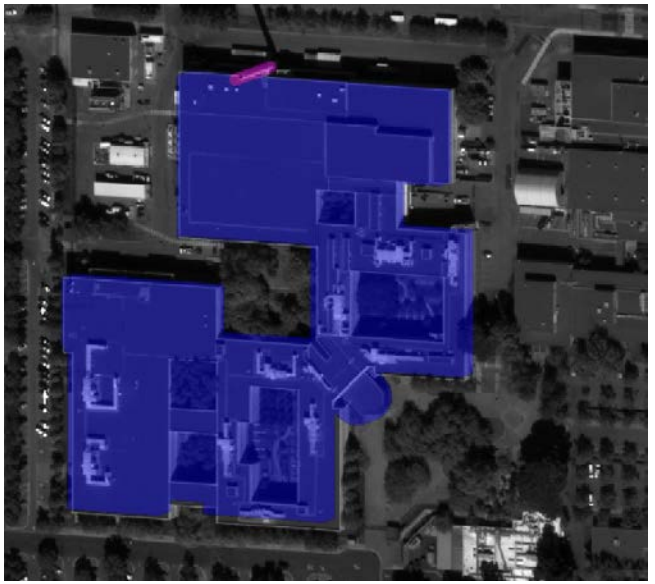
1. Mouse over image and highlighted objects appear
2. Right click over highlighted object and menu of annotation template appears
3. Fill out the template

3D facility models anchor annotations







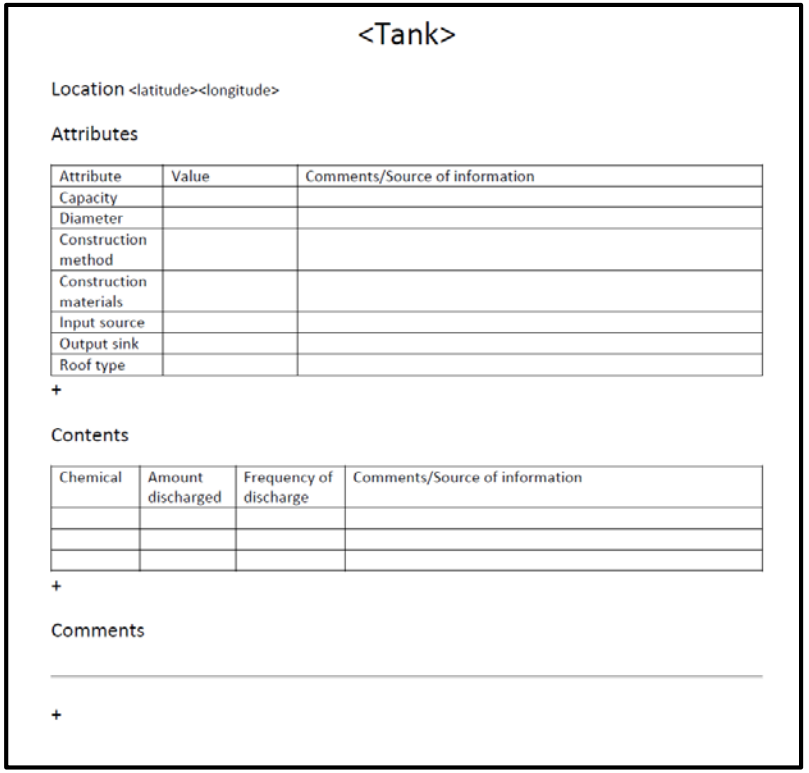


The figures show the 3D model of the building, the template created from the model, and the template applied to the building.

Note the accuracy with which the stack is resolved from the different viewpoints

The GeoVisipedia prototype makes it *easy* for SMEs to add knowledge

- SME accesses template by right clicking on highlighted object in image
- Four templates available for SME input
  - Building
  - Stack
  - Tank
  - Other Structure
- Template provides some structure, but free text entry also allowed
- GeoVisipedia's interface *very* important to its success
  - Many potential interfaces, each designed for specific applications or user communities
  - We are beginning interactions with potential users to determine features of interest and how GeoVisipedia would fit into their workflow



<Tank>

Location <latitude><longitude>

Attributes

Attribute	Value	Comments/Source of information
Capacity		
Diameter		
Construction method		
Construction materials		
Input source		
Output sink		
Roof type		

+

Contents

Chemical	Amount discharged	Frequency of discharge	Comments/Source of information

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Comments

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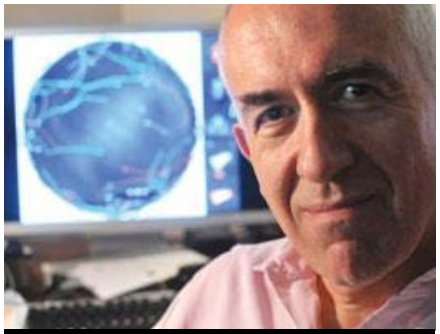
GeoVisipedia is an evolving concept of knowledge connectivity

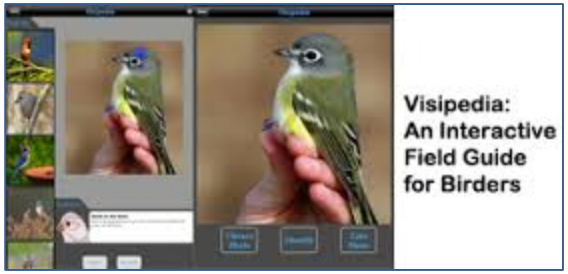
GeoVisipedia

WIKIPEDIA
The Free Encyclopedia

VISIPEDIA



Pietro Perona, Caltech



https://casis.llnl.gov/casis-2014