



# *Footprint Service Specification*

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# *Introduction*

- ✚ Footprints are spatial geometric descriptions
  - ✚ Also referred to as regions on the sky
- ✚ Footprint services will return these regions
  - ✚ Need to be compliant with VO query language  
e.g., 'REGION' in ADQL
- ✚ Have been discussed in Trieste and Balto



# *Field of View*

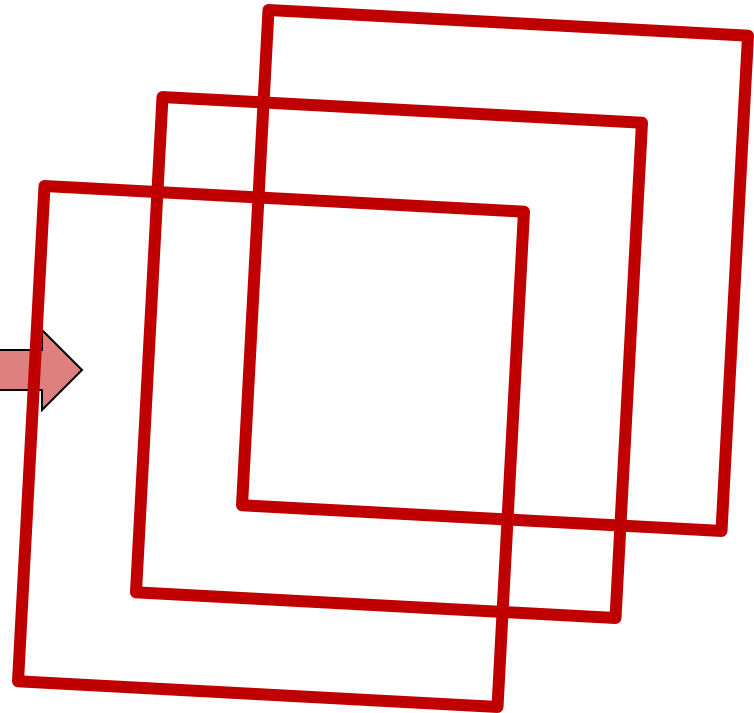
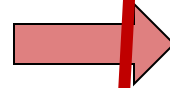
## ✚ Outline of observation(s)





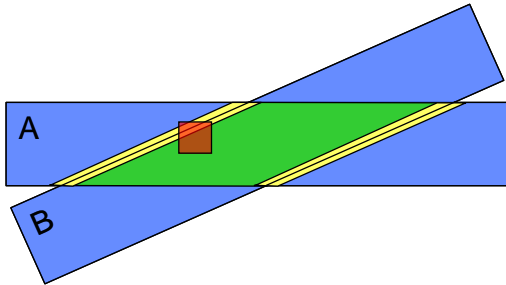
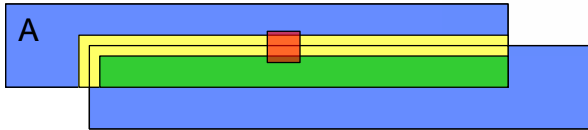
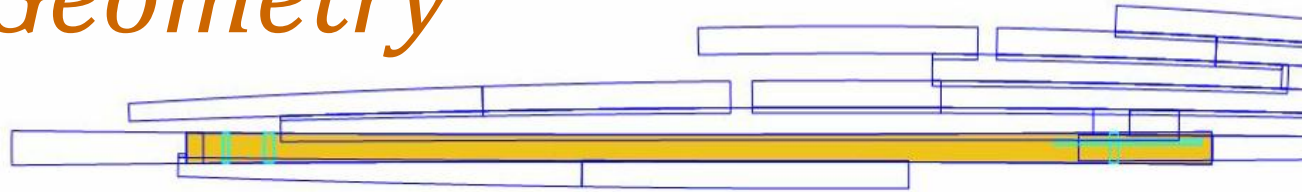
# *Field of View*

## ⊕ Outline of observation(s)

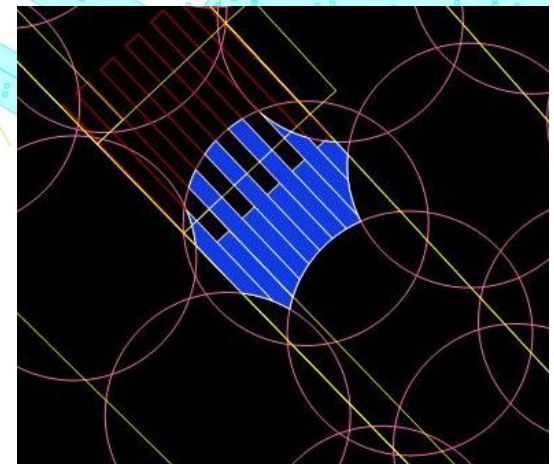
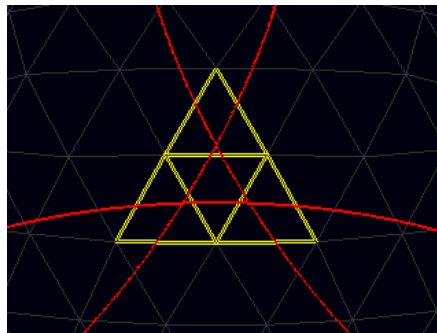
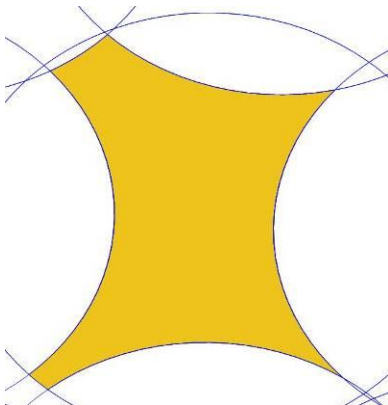
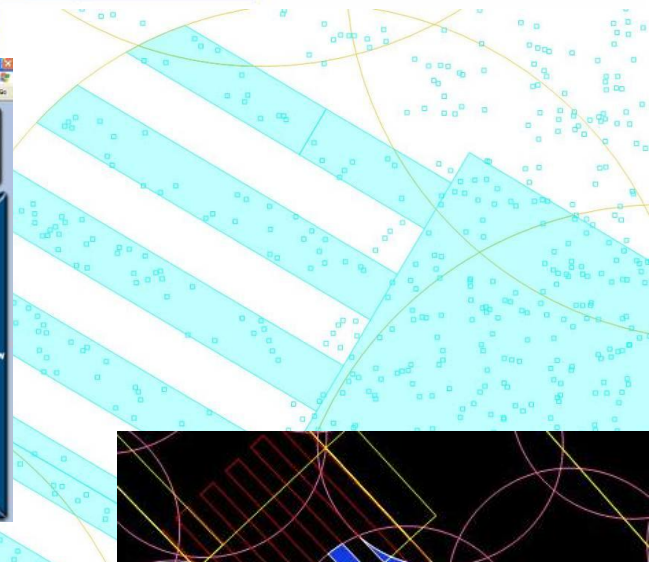
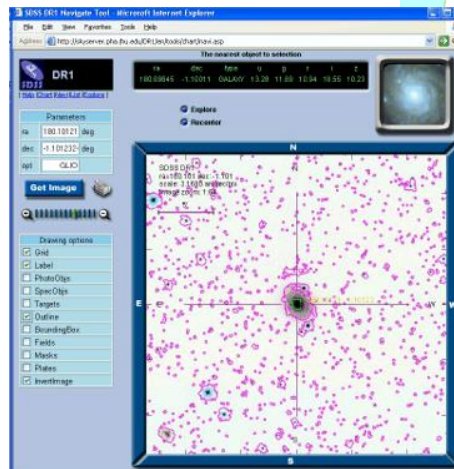




# Complex Geometry

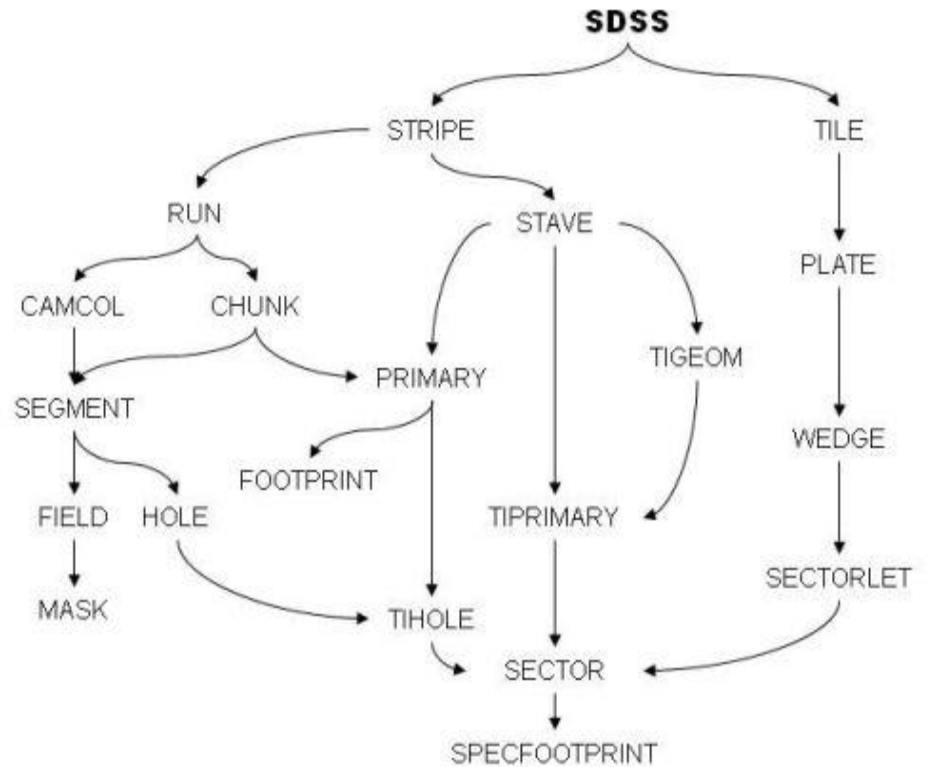
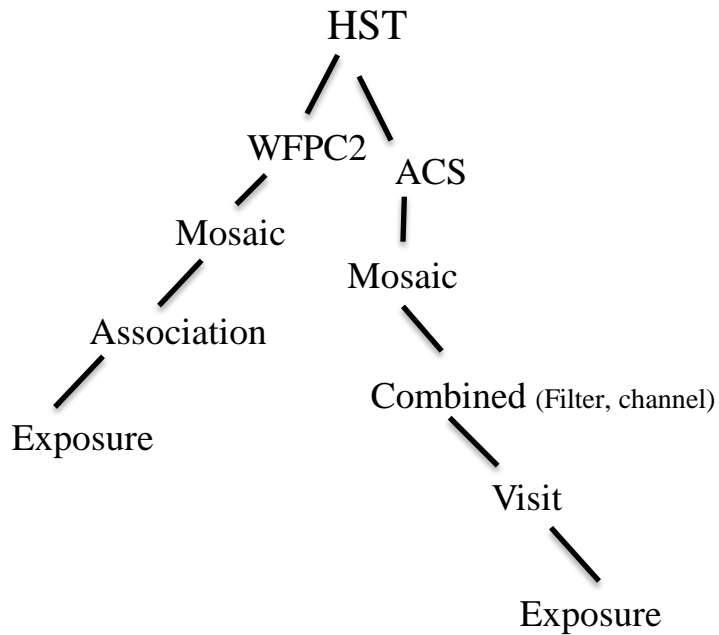


Green area:  $A \cap (B - \epsilon)$  should find B if it contains A and not masked  
 Yellow area:  $A \cap (B \pm \epsilon)$  is an edge case may find B if it contains A.





# Footprint Hierarchy





# *Footprint Services – Level 1*

- ✦ Simplest way to return a footprint

- ✦ GetFootprint()

  - ▣ Could be precise or approximate

  - ▣ Use fill\_factor to signal it

- ✦ Doesn't even have to be dynamic...



# *Footprint Services – Level 2*

## ✚ Access methods

- ✚ GetRegion(id, format)
- ✚ GetArea(id)
- ✚ GetMasks()
- ✚ GetTypes()

## ✚ Search methods

- ✚ Contains()
- ✚ FindByPoint()
- ✚ FindByKey()





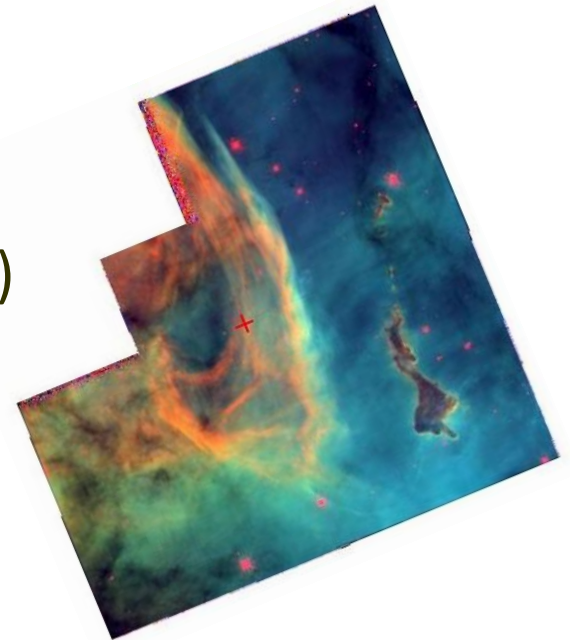
# *Footprint Services – Level 3*

## Operations methods

- Intersection(region, region, format)
- Union(region, region, format)
- DistinctUnion(region, region, format)
- Difference(region, region, format)

## Morph methods

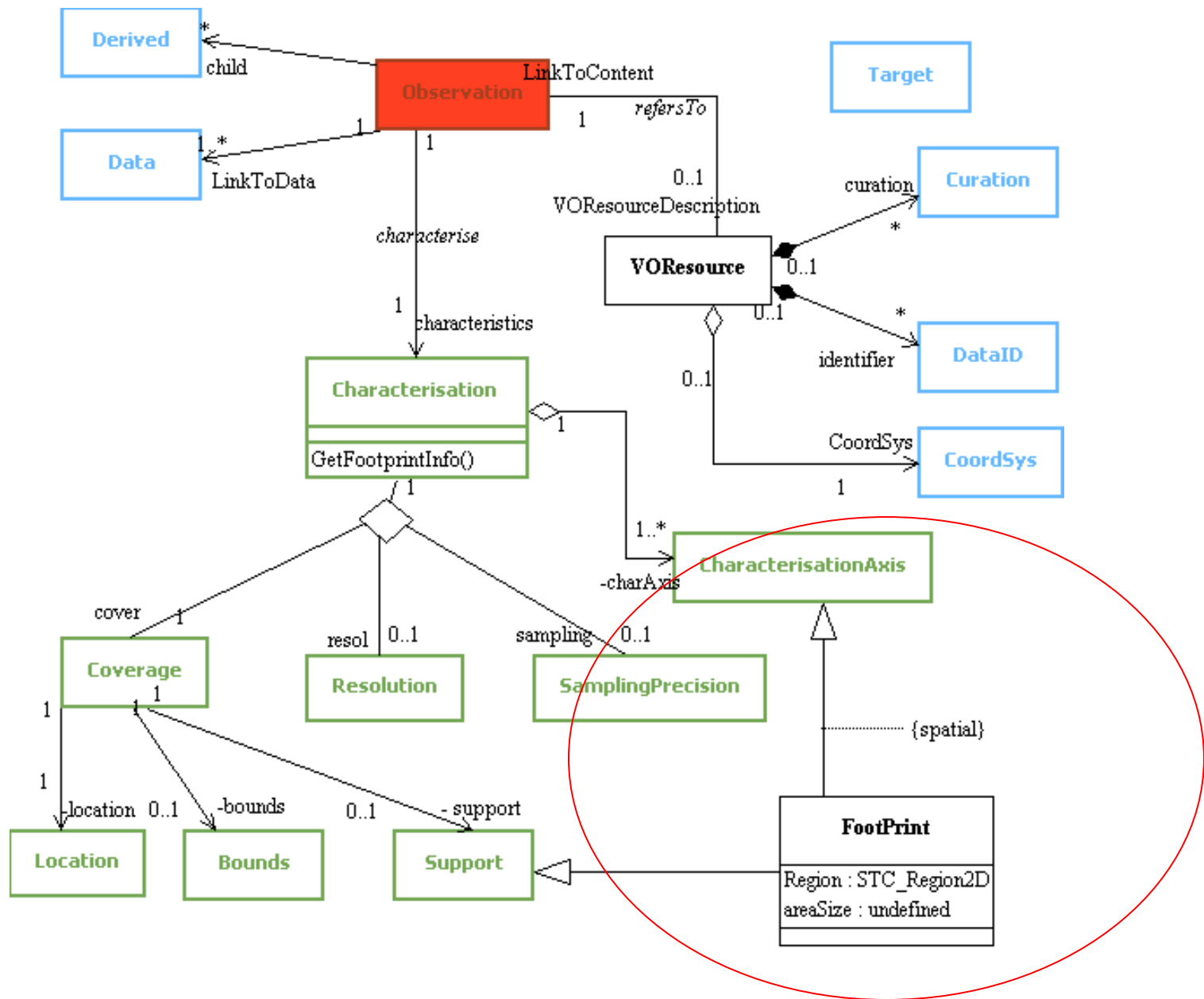
- Dilate(region, buffer, format)
- Erode(region, buffer, format)





# *Data Model Progress*

- ✚ **Characterization has been in place**
  - ✚ Contains spatial coverage in STC Region
  - ✚ Recent resolution of minor issues
  
- ✚ **New Observation DM**
  - ✚ Represent images, spectra, etc.
  - ✚ Contains characterization (and region within)
  
- ✚ **Enables footprint service specification!**





# *In Summary, Our Plans*

## ✚ Build on IVOA standards

- ✚ STC Region + Characterization + Obs DM
- ✚ TAP, ADQL, VOSI?

## ✚ Start IVOA Working Draft

- ✚ Accommodate layers and levels of complexity
- ✚ Develop use-cases, service vs resource orientation

<http://trac.us-vo.org/project/nvo/wiki/Footprints>