Interoperable Polygons

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May 31 2018

IVOA Interoperability Workshop

Victoria, BC, Canada

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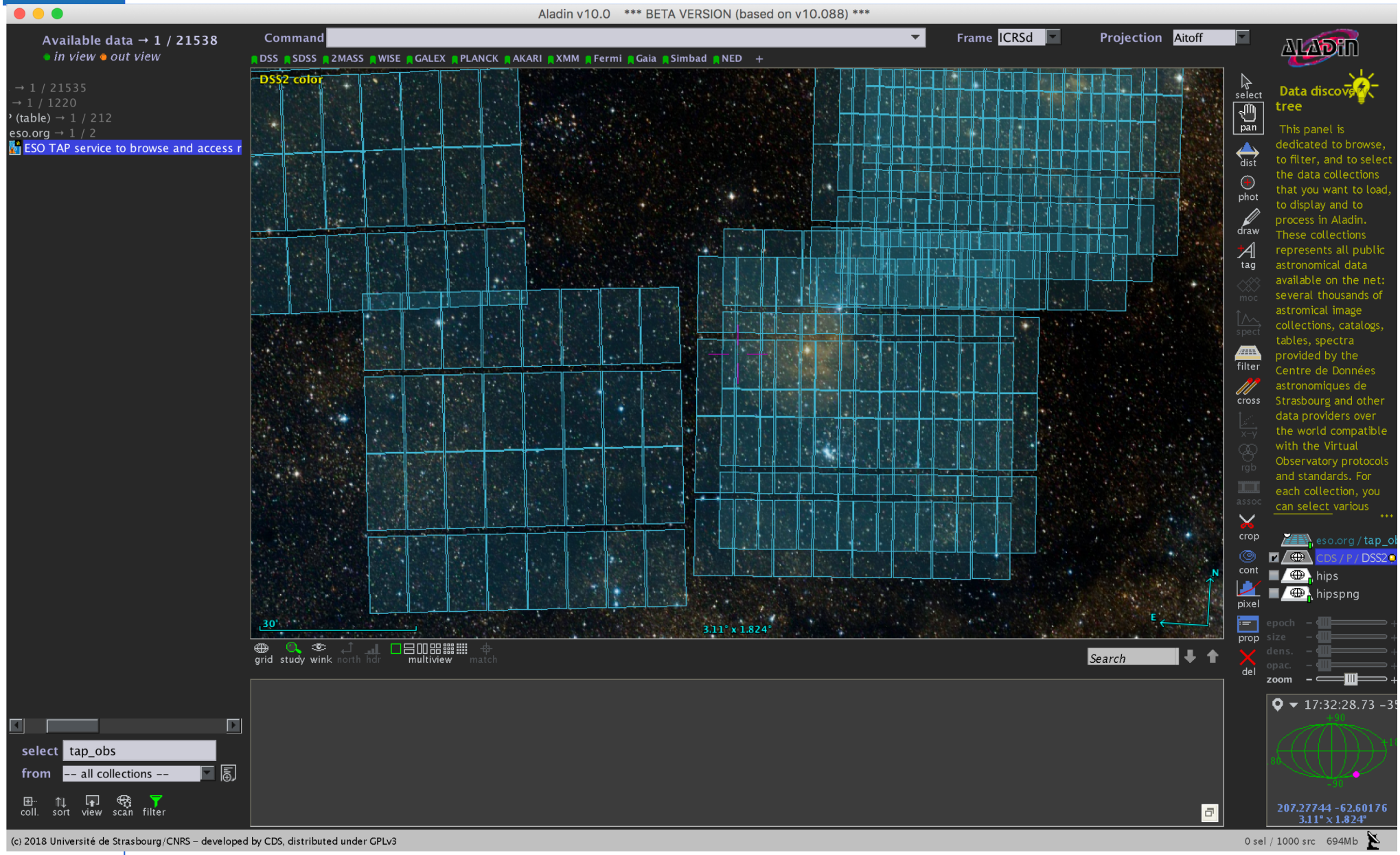

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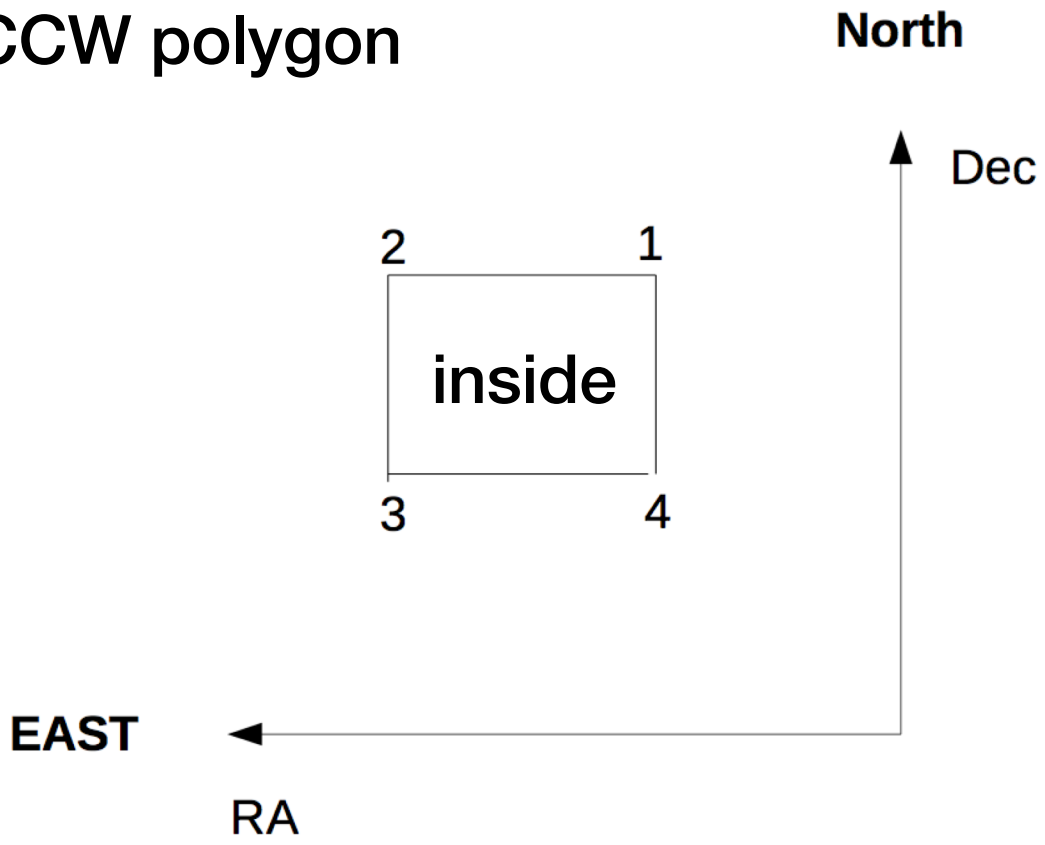
Polygon: STC definition

CCW polygon



Looking from the Earth to the Sky

Polygon implementations

- Very basic check performed:

  I picked 1 random polygon from 5 different data centres

  - 3 data centers: CCW polygons - compliant
  - 2 data centers: CW polygons - not compliant

Polygon interoperability issue

Scenario:

- Data Centre A uses CW polygons
- Data Centre B uses CCW polygons
- A user does not know that, and assumes they all polygons follow the STC standard
- The user queries data centre A and uploads the results to data centre B, with the following constraint:

```
WHERE contains(B.s_region, A.s_region) = 1
```

The intent is to find B footprints that lay inside the A footprint

Instead, the result set contains all the B footprints that do not cross the (real) A footprint.

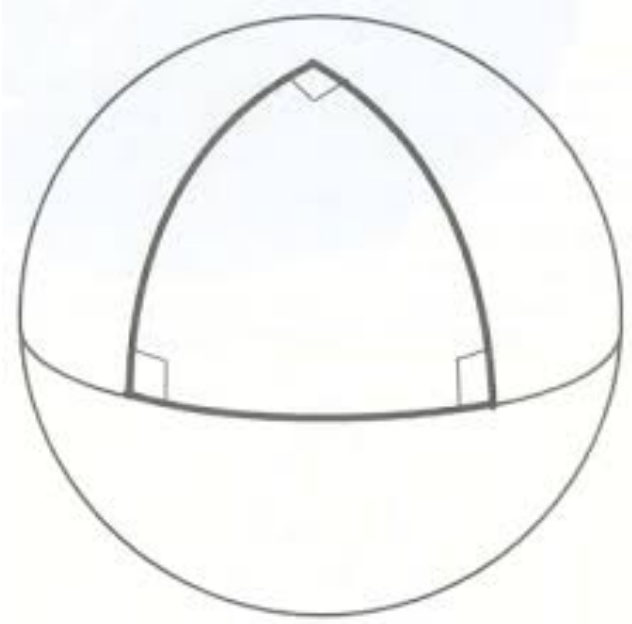
STC needs an errata 1/2

The formula in 4.5.1.4 states:

*"A = - SUM[A(i)] – (n-2) *pi"*

but:

A = (RA,DEC)[0] = (90, 0)
B = (RA,DEC)[1] = (0, 0)
C = (RA,DEC)[2] = (0, 90)



The three angles of the polygon are all 90 deg, or pi/2 rad by construction.

A in the above case is: -3 * pi/2 –pi = -5/2 pi,
while one expects an area of pi/2.

Correct formula: A = +SUM[A(i)] – (n-2) *pi

STC needs an errata 2/2

*"If A < 0, one used the "outside" angles of the polygon and the area is really 4*pi - A."*

That is also wrong because if A < 0 then
4*pi – A is > 4*pi, and that cannot be.