TESELA

A new tool to determine blank fields for astronomical observations

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Scientific Rationale

The correct exploitation of data is critical in astronomy

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Image flatfielding

- Usually twilight flatfields
- Very short time windows
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- cannot always be performed using the same target frames
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For this purpose the use of blank fields is essential

Catalogues of blank fields

- No systematic catalogue is available
- The web page created by Marco Azzaro

http://www.ing.iac.es/~meteodat/blanks.htm

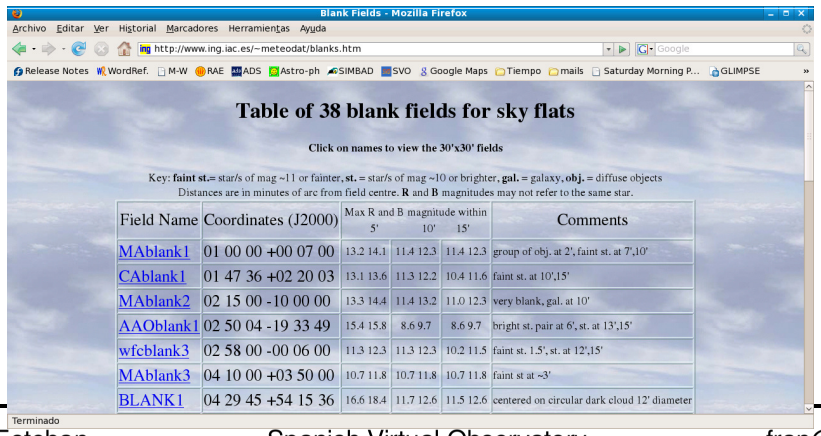

Table of 38 blank fields for sky flats

Click on names to view the 30'x30' fields

Key: **faint st.**= star/s of mag ~11 or fainter, **st.** = star/s of mag ~10 or brighter, **gal.** = galaxy, **obj.** = diffuse objects
Distances are in minutes of arc from field centre. **R** and **B** magnitudes may not refer to the same star.

Field Name	Coordinates (J2000)	Max R and B magnitude within 5'	10'	15'	Comments
MAblank1	01 00 00 +00 07 00	13.2 14.1	11.4 12.3	11.4 12.3	group of obj. at 2', faint st. at 7',10'
CAblank1	01 47 36 +02 20 03	13.1 13.6	11.3 12.2	10.4 11.6	faint st. at 10',15'
MAblank2	02 15 00 -10 00 00	13.3 14.4	11.4 13.2	11.0 12.3	very blank, gal. at 10'
AAOblank1	02 50 04 -19 33 49	15.4 15.8	8.6 9.7	8.6 9.7	bright st. pair at 6', st. at 13',15'
wfcblank3	02 58 00 -00 06 00	11.3 12.3	11.3 12.3	10.2 11.5	faint st. 1.5', st. at 12',15'
MAblank3	04 10 00 +03 50 00	10.7 11.8	10.7 11.8	10.7 11.8	faint st at ~3'
BLANK1	04 29 45 +54 15 36	16.6 18.4	11.7 12.6	11.5 12.6	centered on circular dark cloud 12' diameter

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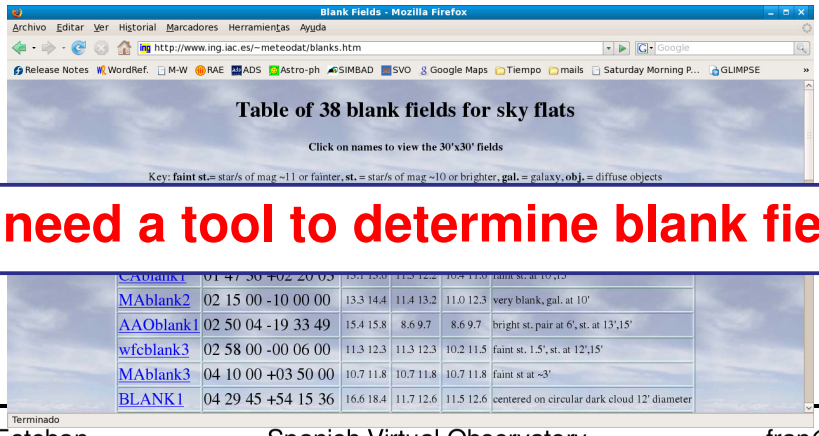
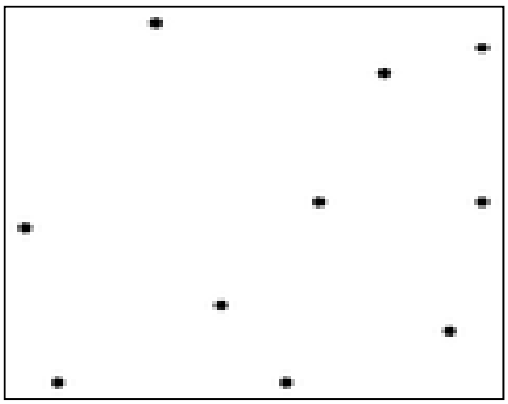


We need a tool to determine blank fields

Tessellating the sky

- Uses the stars as nodes of the triangulation
  - Merging closer stars than 1”



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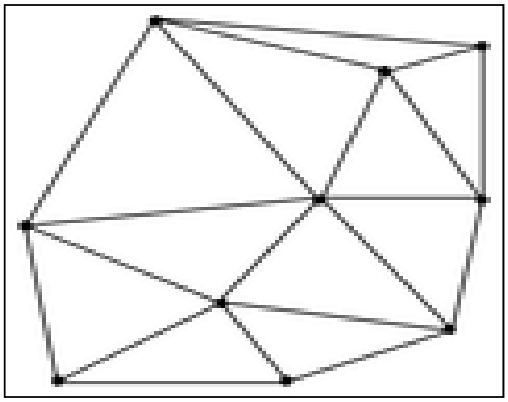
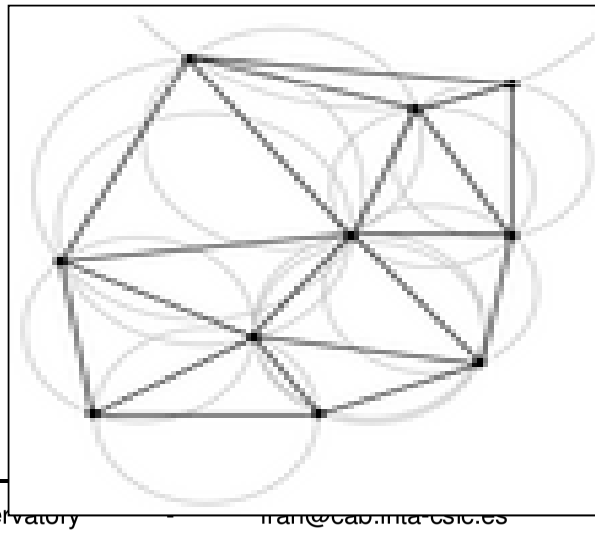
- Based on the Delaunay triangulation



CONSOLIDER-INGENIO GTC

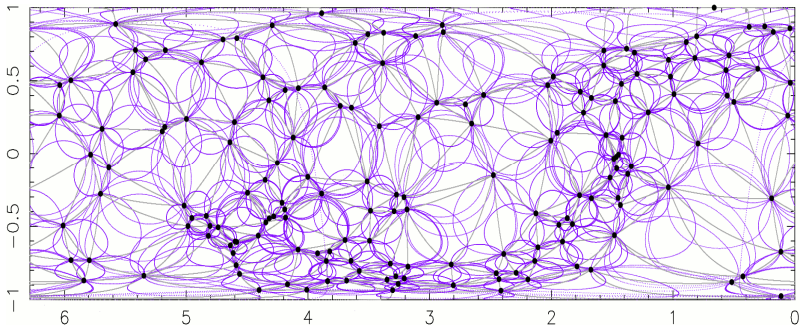
Tessellating the sky

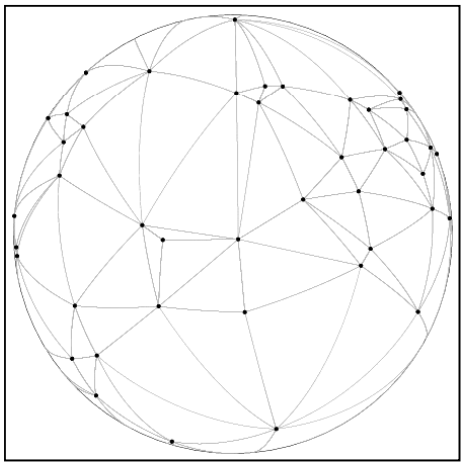
- Uses the stars as nodes for the triangulation
  - Merging closer stars than 1”
- Based on the Delaunay triangulation
- The empty circumcircle interior property



Tessellating the sky

Result with stars up to 4 magnitude





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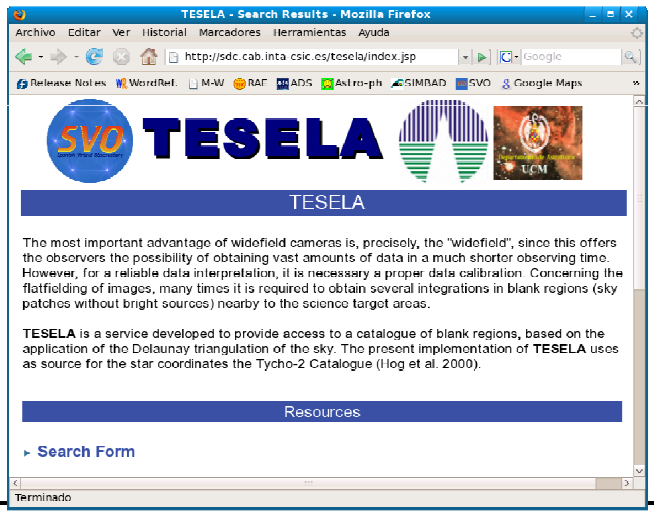
The web tool

http://sdc.cab.inta-csic.es/tesela/index.jsp



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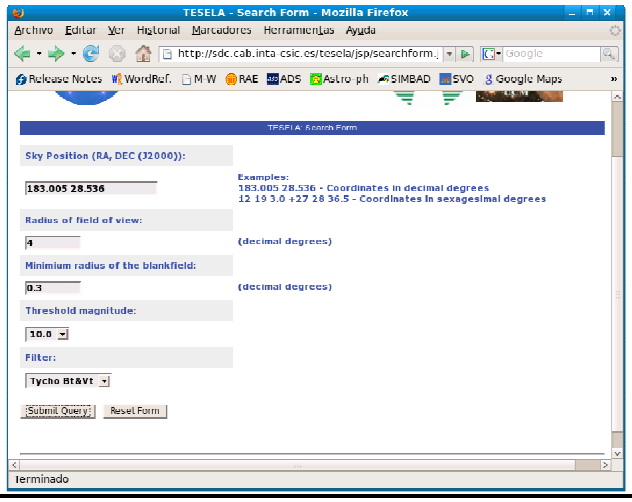

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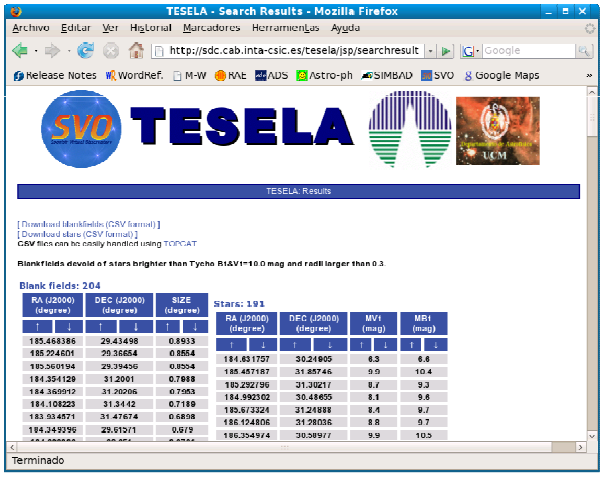

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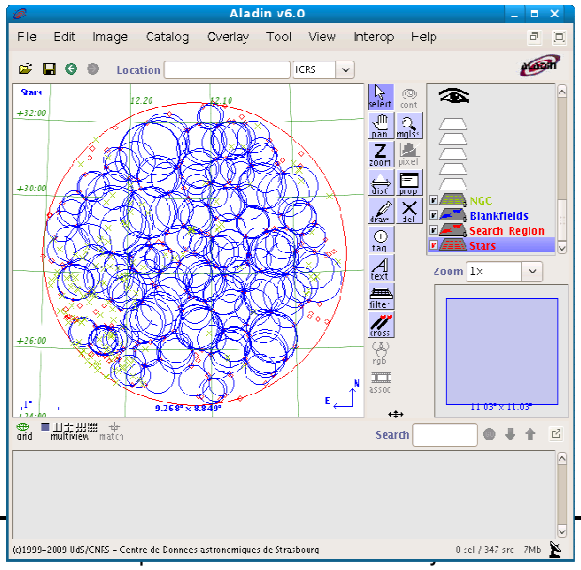
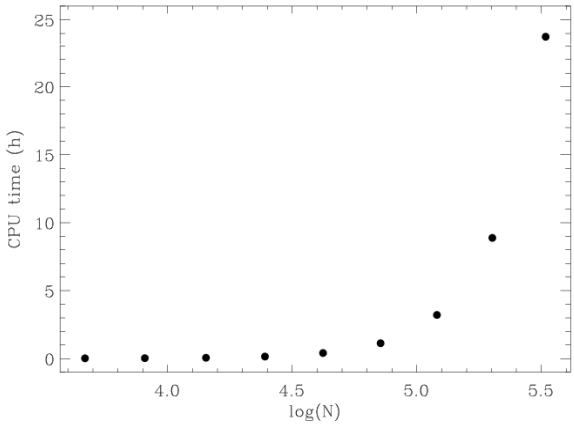


Going deeper

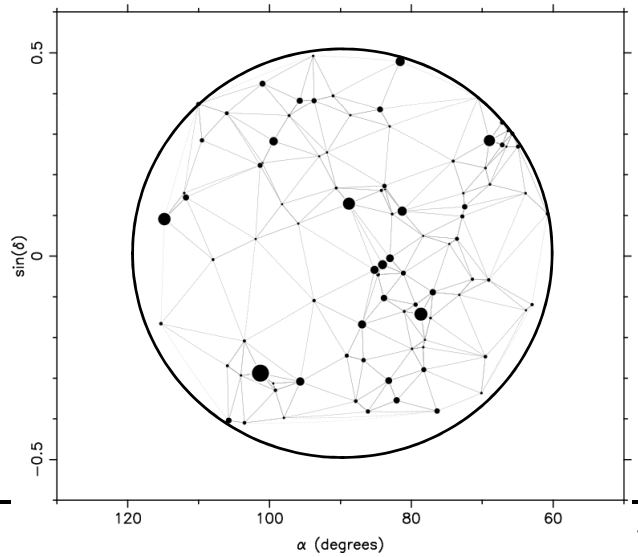
Problem: The number of stars increases exponentially with the magnitude → computer requirement

Threshold magnitude
from 6 to 10
in steps of 0.5 mag



Going deeper

Solution: Tessellating many smaller regions



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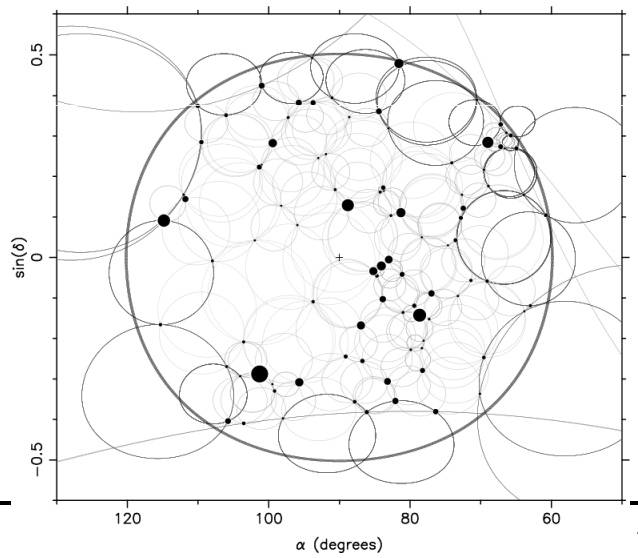
Side effect



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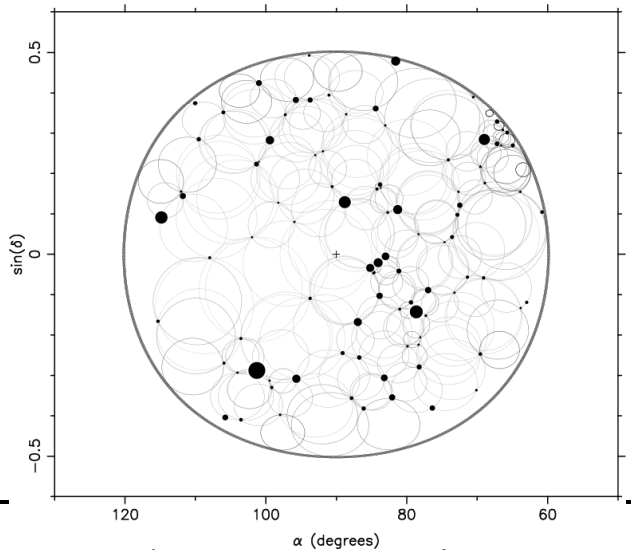

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- ~(18h,30º)
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- 17h<RA<19h
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- ~900 square deg
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Result:

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- 16 mag ⇒ 7 BF with diameter > 8'

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The list of blank fields is at the GTC

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Future work

- Include the web-tool with the tessellation in small regions
- Extend to other catalogues and filters
- Continue providing GTC with new BF

Thanks

especially to CALAMARES

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