Generating HiPS surveys from ESO and HST outreach images

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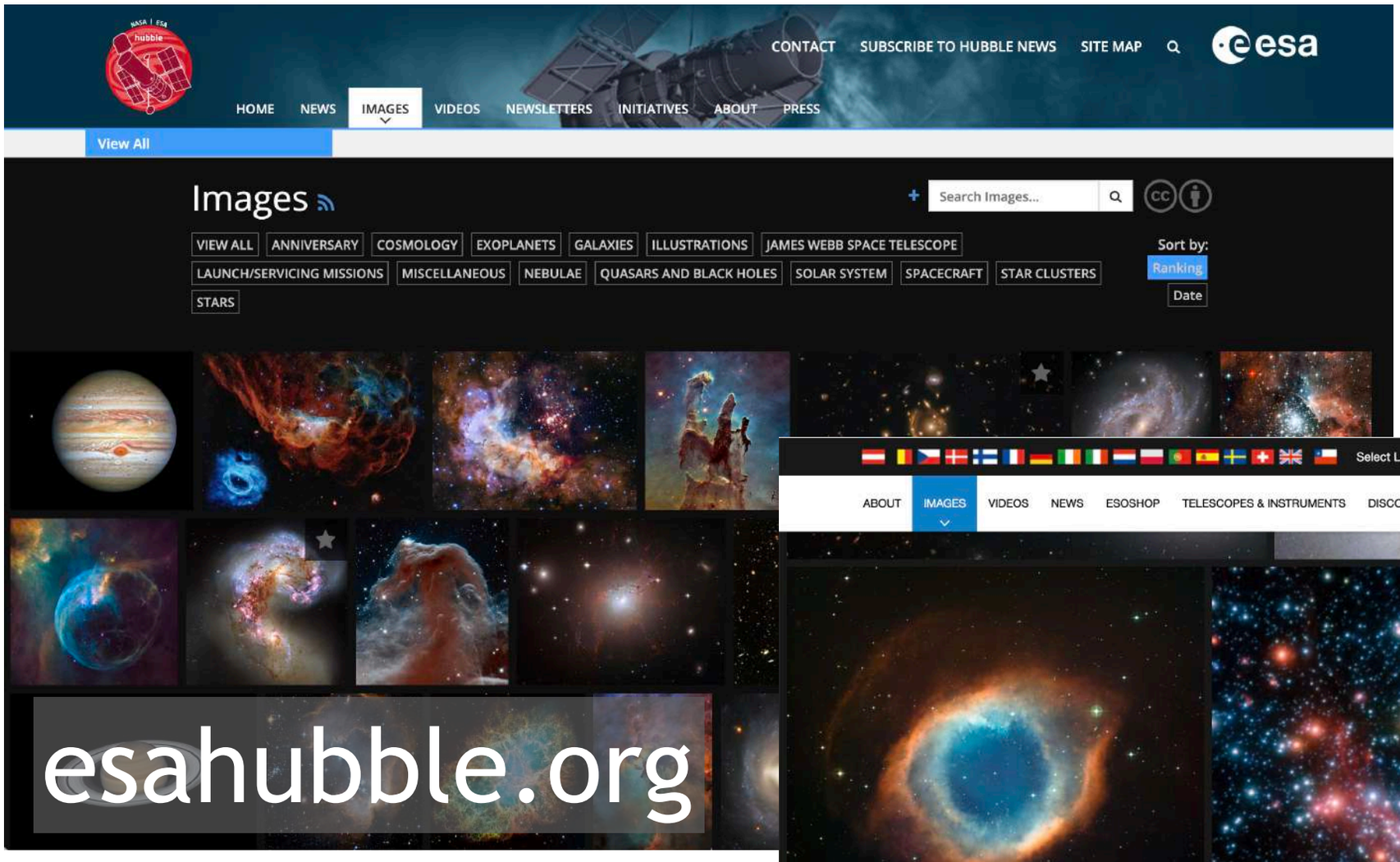
and the Aladin team

IVOA Bologna 2023 - Education

CENTRE DE DONNÉES
ASTRONOMIQUES DE STRASBOURG

The idea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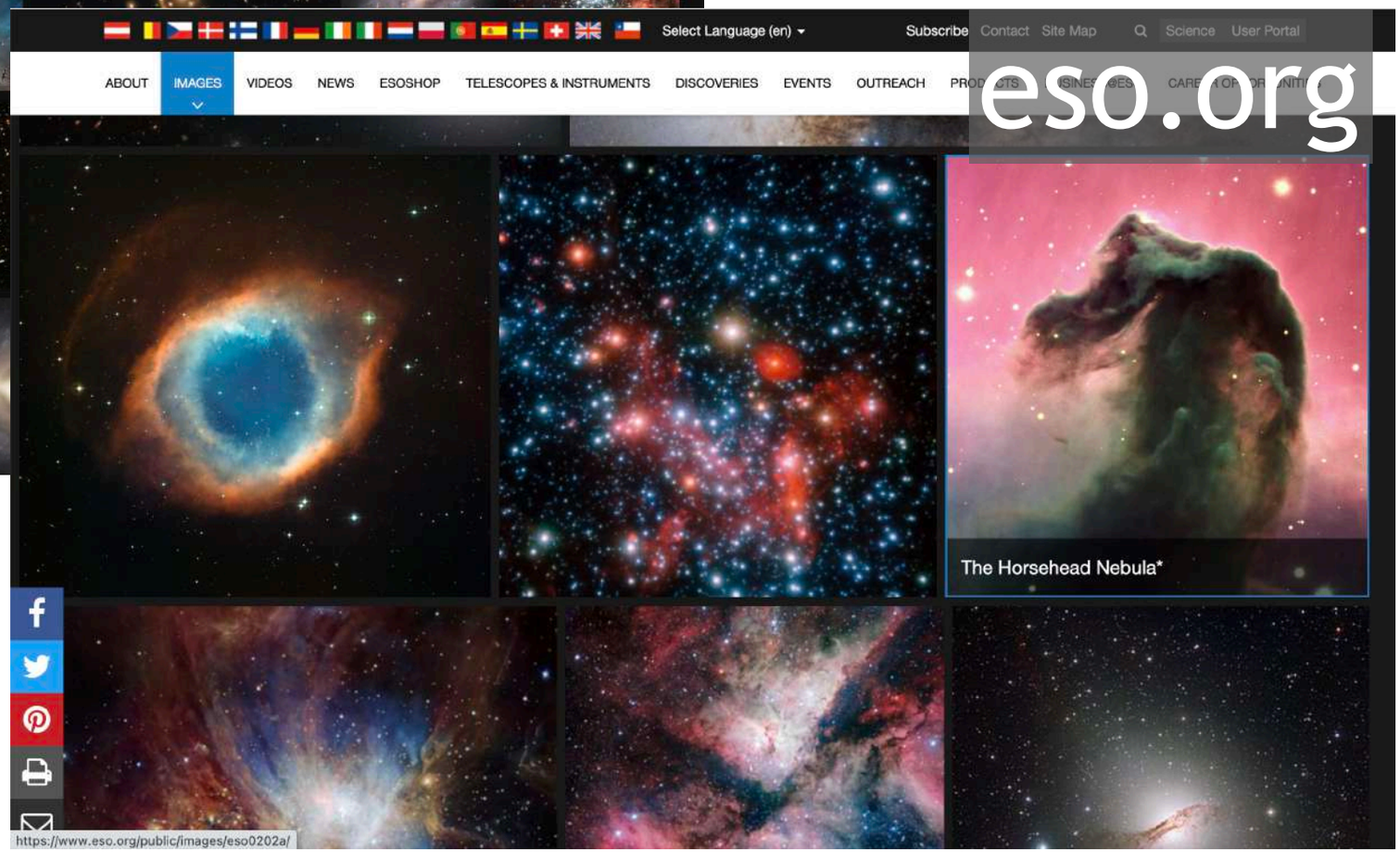
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The Horsehead Nebula*
https://www.eso.org/public/images/eso0202a/

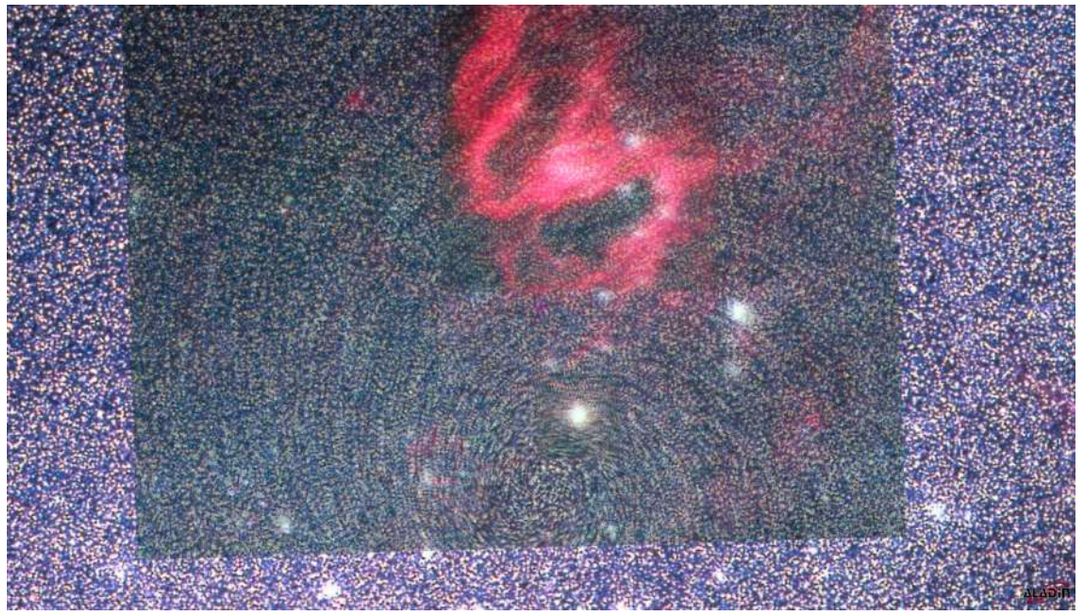
First attempt

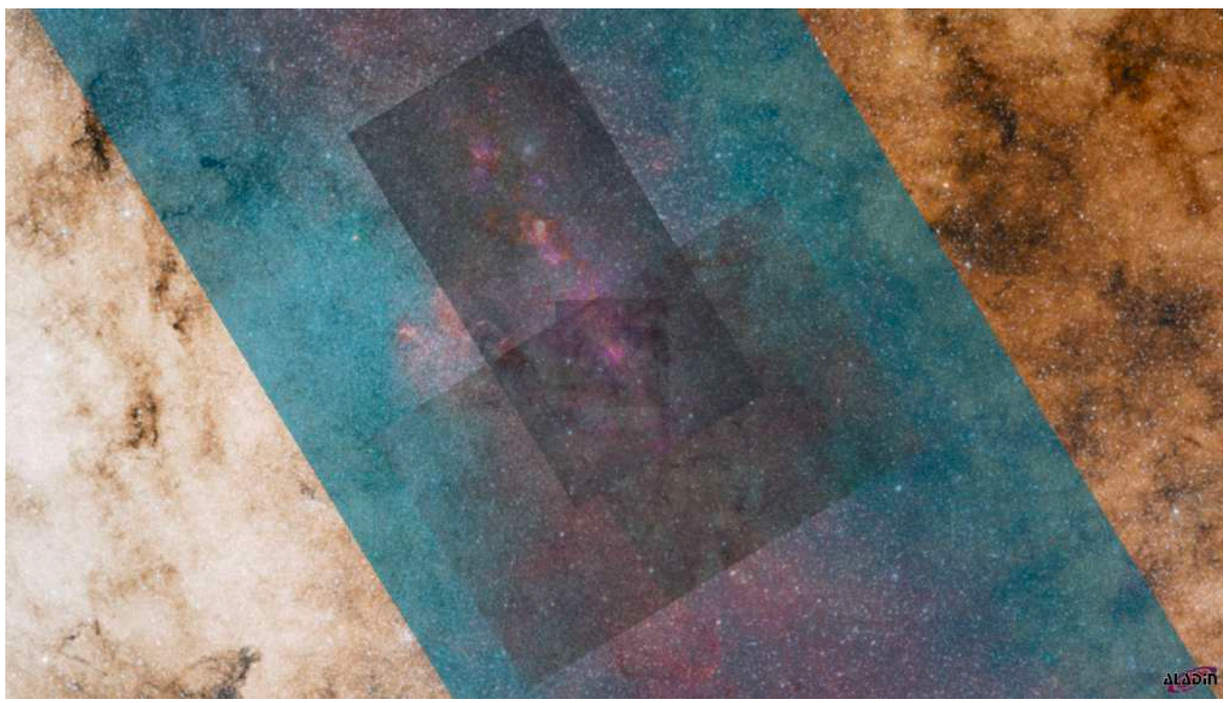
- Crawl images from ESO (resp. HST) website
- Filter out images without astrometry AVM tags
  - 1140 ESO images kept
  - 2300 HST images kept
- Create WCS headers from AVM tags

- Choose HiPS order
  - ESO outreach HiPS: order 12
  - HST outreach HiPS: order 14
- Launch Hipsgen and be patient

First result

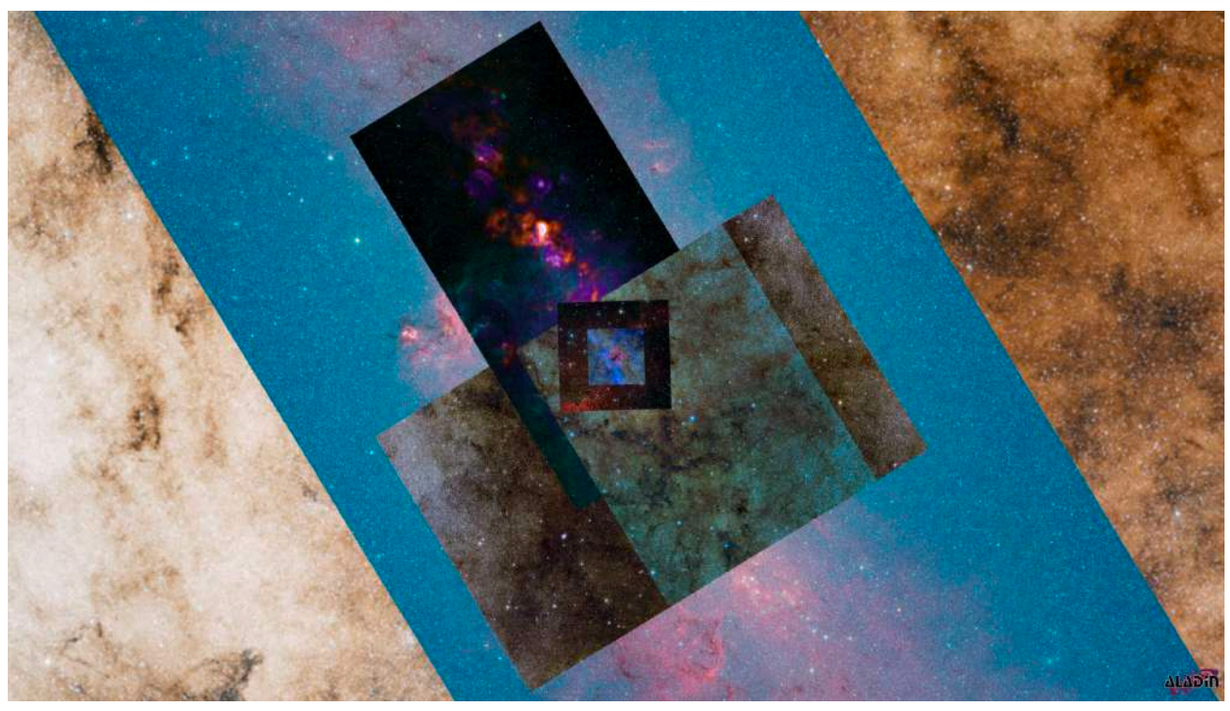
- Pixels from overlapping images are blended together
  - Astrometry offsets, errors, rotations very visible
- Not very "readable"





Second attempt

- Read AVM tags to compute covered area on the sky
- Sort images by covered area on the sky (largest to smallest)
- Build HiPS image by image, using Hipsgen **OVERWRITE** mode

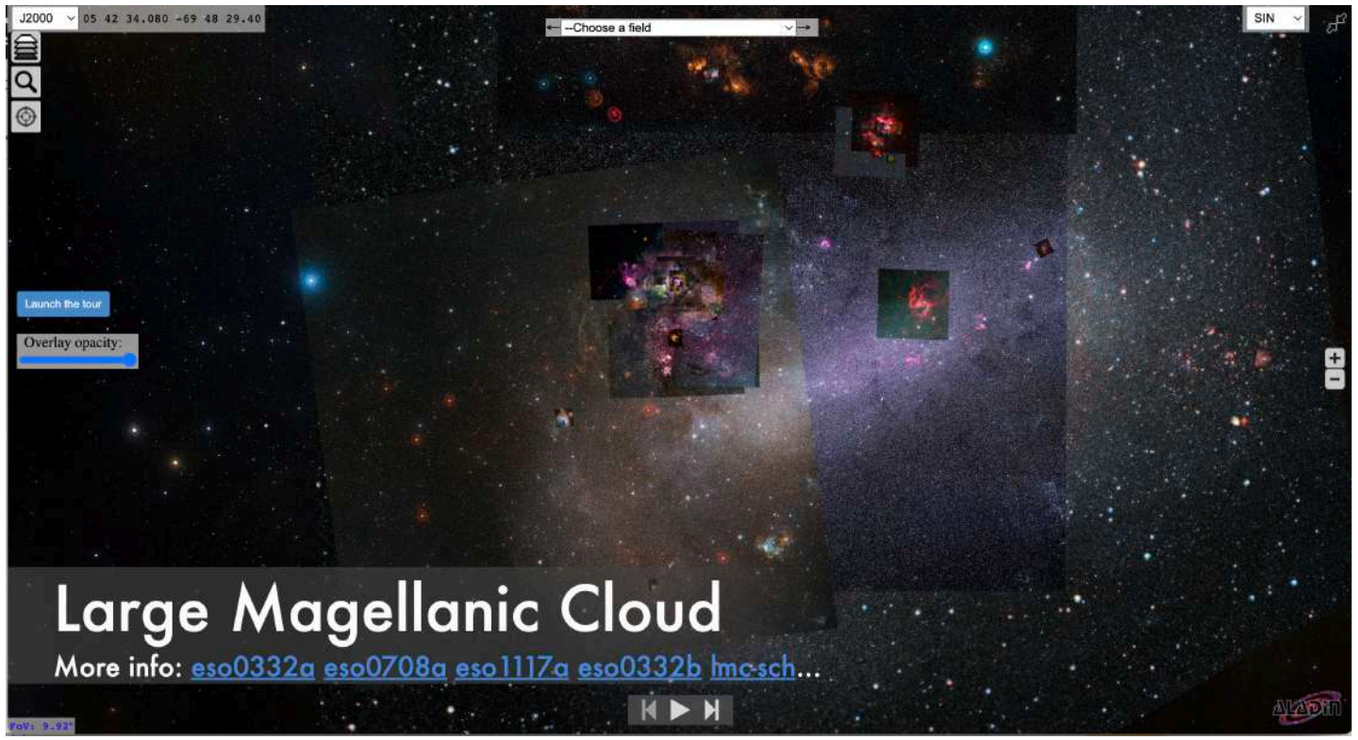


Icing on the cake

- Aladin Lite landing page
  - DSS2 background for context
  - Add list of targets (retrieved from AVM tags)
  - Create tour animation for ESO outreach HiPS
- Keyboard shortcuts
  - Arrows to change target
  - I: zoom In
  - O: zoom Out
  - T: Toggle layer on/off

Results and demo

- HiPS published and available in the HiPS network
  - https://alasky.cds.unistra.fr/ESO-outreach/CDS_P_ESO_EPO/
  - https://alasky.cds.unistra.fr/HST-outreach/CDS_P_HST_EPO/



- Links to progenitors available from Aladin Desktop

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84.59111	-69.07345	eso0005a	https://www.eso.o	eso0005a.jpg	FoV
84.71602	-69.09161	eso0216a	https://www.eso.o	eso0216a.jpg	FoV
84.70225	-69.10425	eso0216b	https://www.eso.o	eso0216b.jpg	FoV

Going further

- Updating existing ESO/HST HiPS
  - Retrieve new images, and replay the whole process
- HiPS from other sets of outreach images
  - Astrometry must be good enough to make resulting HiPS useful

HiPS and planetaria

- HiPS support in Digistar 7
  - Access to 1000+ published HiPS datasets
- Strasbourg new planetarium will benefit from this
  - Will open this summer