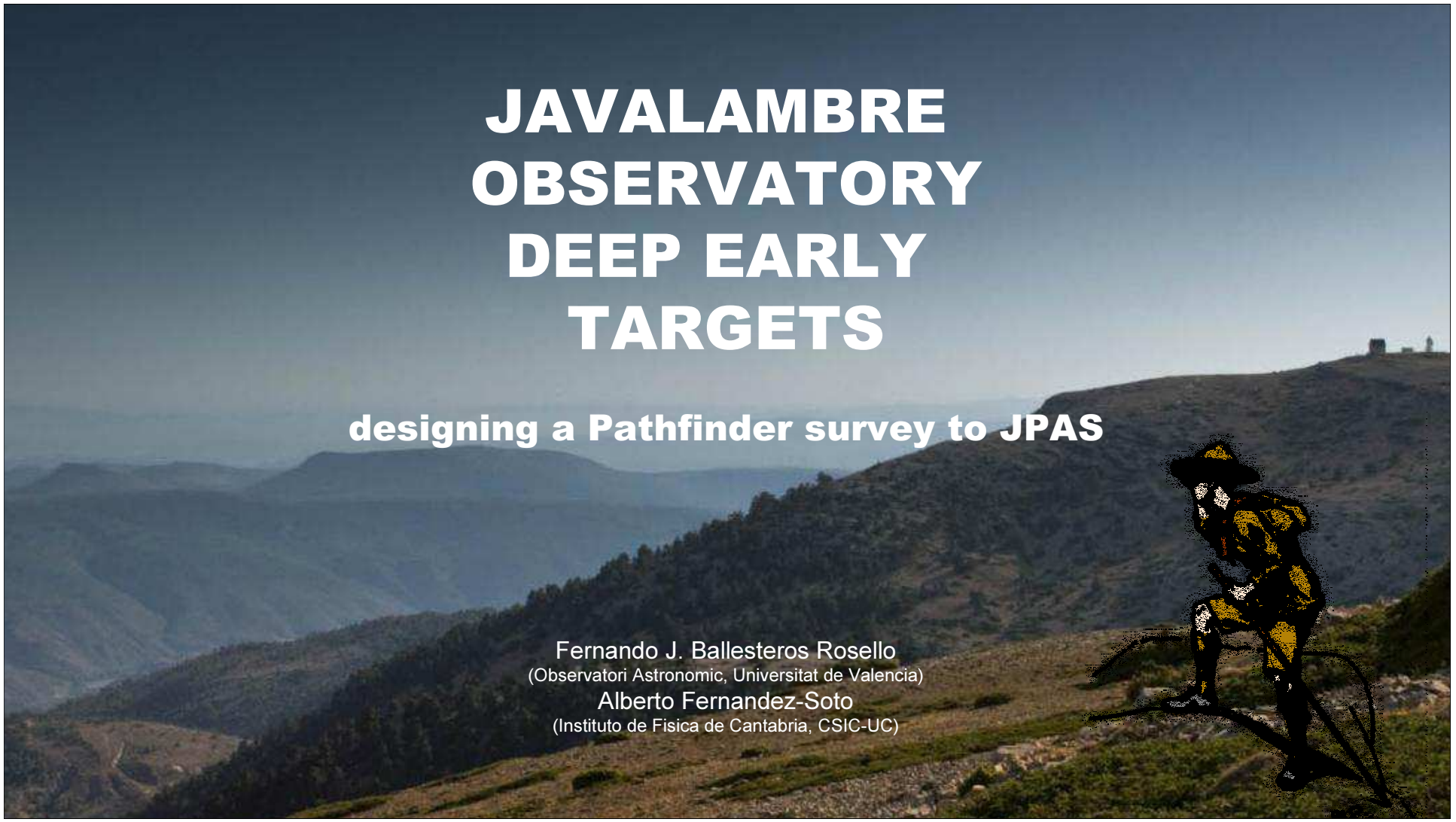


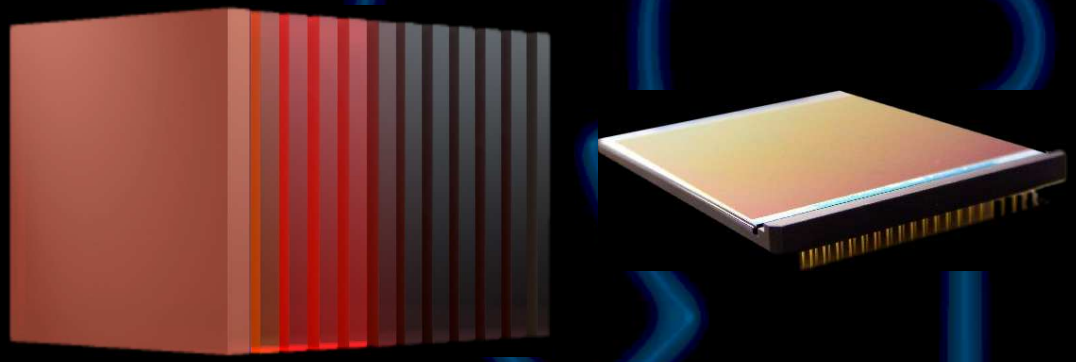
JAVALAMBRE OBSERVATORY DEEP EARLY TARGETS

designing a Pathfinder survey to JPAS

Fernando J. Ballesteros Rosello
(Observatori Astronomic, Universitat de Valencia)
Alberto Fernandez-Soto
(Instituto de Fisica de Cantabria, CSIC-UC)

Need for a Pathfinder survey

- The T250 telescope will come on-line, with all its systems ready, by the end of summer 2013 (much earlier than the JPCam camera).
- A sizeable subset of the JPAS 56-filter set could also be available by the same time. They would be 12 contiguous filters, from Hα redwards (TBD).



- EEV should also have provided us with the first of the JPCam CCDs.

Need for a Pathfinder survey

- This CCD will be mounted on a camera, and adapted to the T250 focal plane, where it will cover an approximate area of 0.58x0.58 square degrees.

- It will have a double filter wheel, able to mount 12 JPAS filters simultaneously.

- As our best estimates for the beginning of JPCam operations put it around summer 2015, there is a period of approximately **15 months** during which the telescope will be fully operational but the central JPAS project cannot be carried out.

- Therefore, it is suitable to take profit of the interim time to test the telescope, the filter concept, and the data management and pipelines.

→ Pathfinder Survey design

Pathfinder survey conditions

1. It should be **feasible within a 1-year period**, taking into account all weather and possible technical limitations

2. It must **use the mentioned camera/telescope** combination, being similar in scope to JPAS, with the necessary reduction in focal plane size and filter wavelength coverage

3. Its velocity will be 1/2 of JPCam (~750 sqdeg/year).

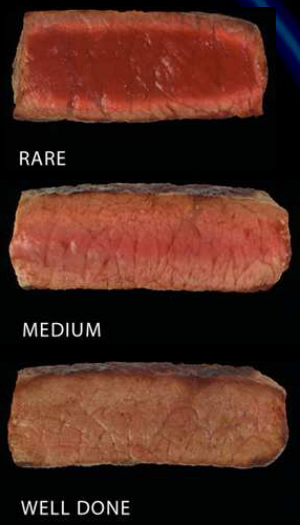
4. It will allow the different groups to **use and check the techniques, pipelines, methods**, etc. that will be instrumental in the development of JPAS once JPCam becomes available.

5. It will produce science interesting by itself (basically the same as JPAS although with less area and filters) helping to make OAJ and JPAS visible to the community.

Area/Depth strategy

It was decided to break the survey in three subsurveys á lá VVDS, with different depths:

- A shallow survey with the depth of JPAS (Texp=225 s) covering ~240 sqdeg.
- A medium survey exposing ~4x JPAS (900 s) (~m_{lim}+1) covering ~60 sqdeg.
- A deep survey exposing ~16x JPAS (3600 s) (~m_{lim}+2) covering ~15 sqdeg.



As targets need to be visible along all epochs of the year, we need to split each subsurvey in different sections covering different right ascensions.

Points of interest

1 DEEP2 (RA~2.5, Dec~0) (=CFHT1, XXL, NDWFS2, VVDS, SXDS, VIPERS), August to December

2 Lockman Hole (RA~11, Dec~+60), October to May

3 Hubble Deep Field (RA~12.5, Dec~+60) (=Chandra Deep Field, GOODS-N), November to June

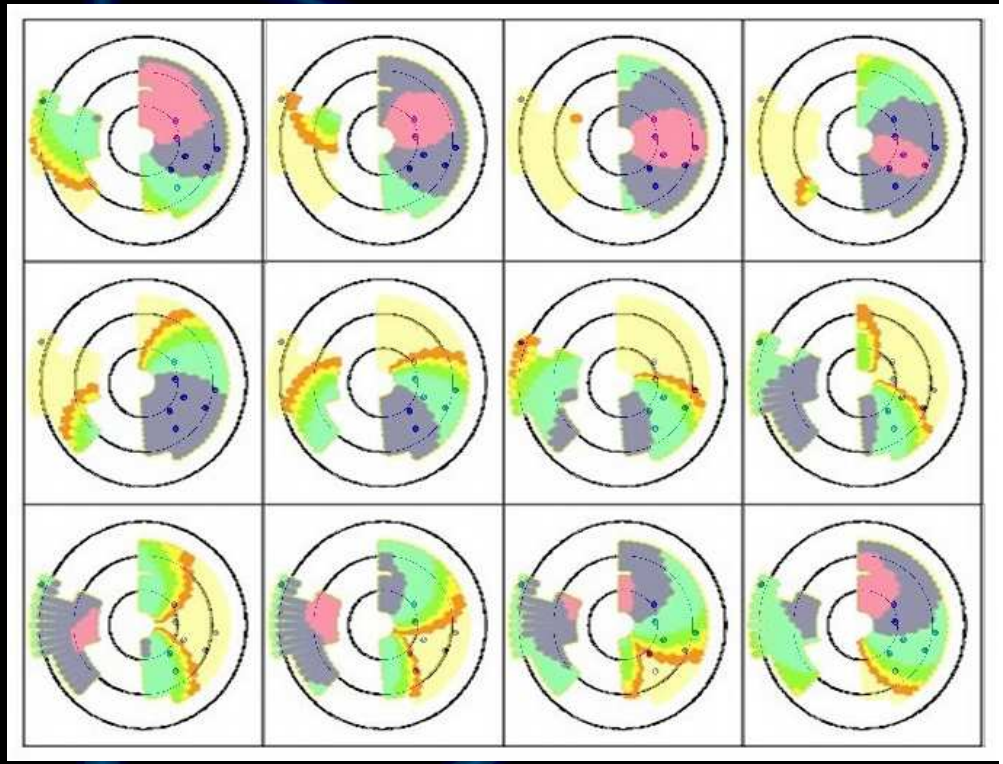
4 Subaru Deep Field (RA~13.5, Dec~+25), December to June

5 Extended Groth Strip (RA~14.5, Dec~+50) (=CFHT3,DEEP2), December to July

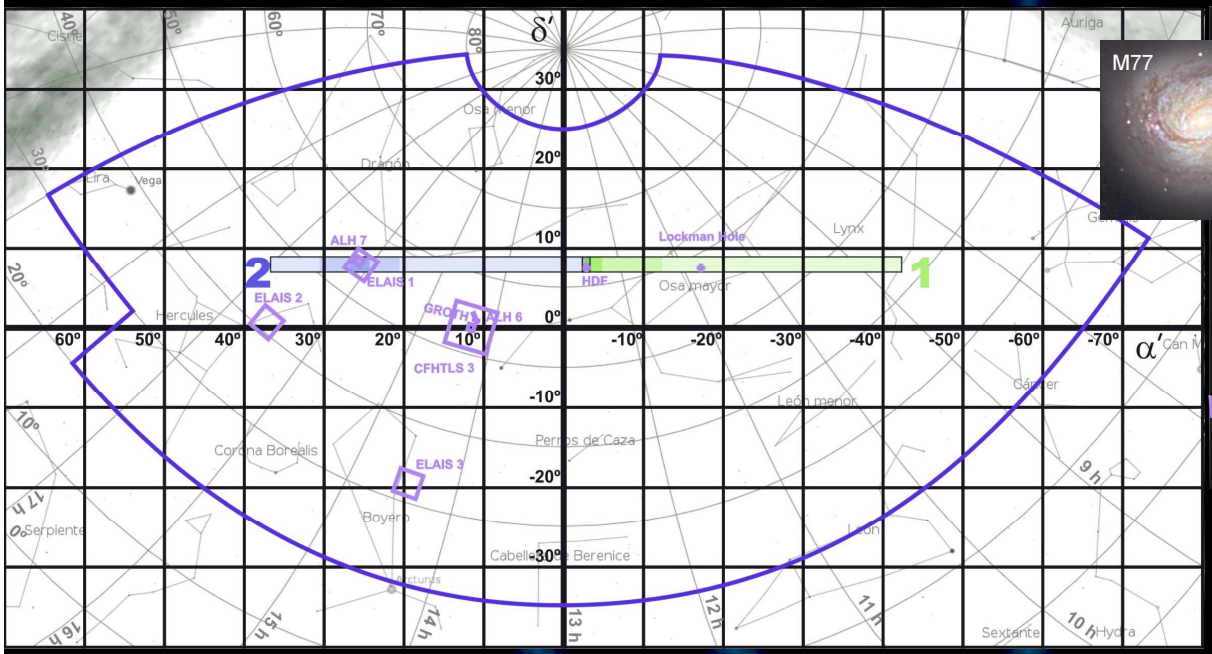
6 ELAIS-N3 (RA~14.5, Dec~+30) (=NDWFS#1), December to June

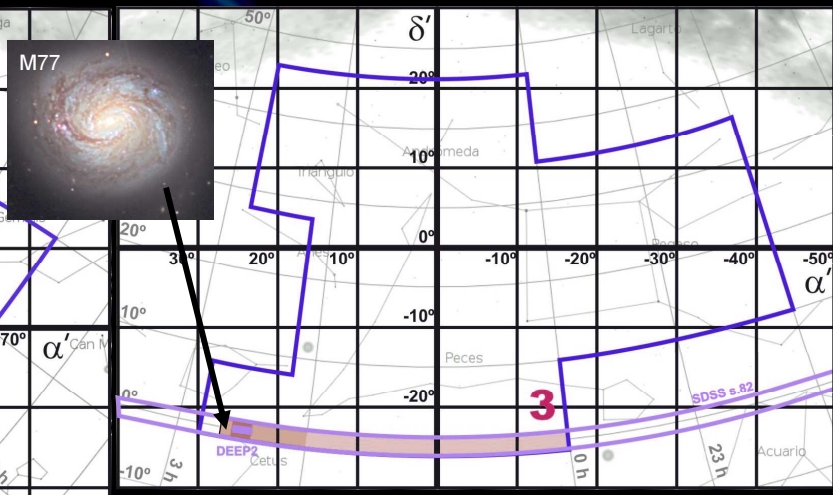
7 ELAIS-N1 (RA~16, Dec~+55), December to September

8 ELAIS-N2 (RA~16.5, Dec~+40), January to August



Field proposal





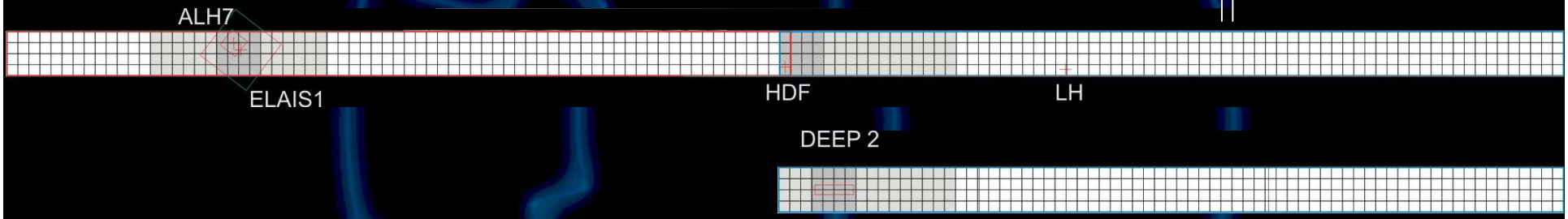
Dead time between fields (above 40º):
- from 2 to 3: 25 min.
- from 3 to 1: 0 min.

Three stripes (~along RA to assure good observability along the whole year):
- 2 in the North field, defined along JPAS coordinates.
- 1 in the South field, using equatorial coord.
- Stripes 1 and 2 consecutive to create a ~80º long stripe (overlapping at HDF).

Field proposal

Shallow, medium and deep subsurveys fit inside each other as russian matryoshkas to gain depth:

distance between pointings (to allow overlap): 0.573º



3x
- Shallow: 4x71 pointings each strip (~93 sqdeg). Texp = 1xJPAS
- Medium: 4x16 pointings each strip (~21 sqdeg). Texp = 5xJPAS
- Deep: 4x4 pointings each strip (~5.25 sqdeg). Texp = 21xJPAS (at HDF: 22xJPAS)

Simulation results

- Respecting the strategy 2+1+1
- Observing all 12 filters in a given pointing consecutively (within the same night)

This survey will not be completed within a year (though it will be close) because deep areas (observed during long time) “cannibalise” the rest of the fields.

Possible solutions:

1. Allowing observations down to 35º over the horizon does not help.
2. Eliminating the medium survey in the DEEP2 string allows its completion.
3. Reducing the width of stripes from 4 to 3 pointings (reducing the area) allows almost the completion of the survey.
4. Increasing the survey time (up to 1.5 years)


THANKS!