



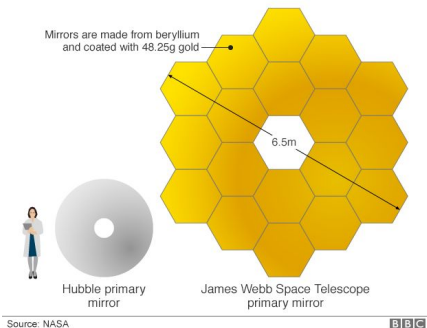
JWST Extragalactic Deep Legacy Surveys ANO4

Laurence Tresse



CENTRE DE RECHERCHE ASTROPHYSIQUE DE LYON

Mirrors are made from beryllium and coated with 48.25g gold

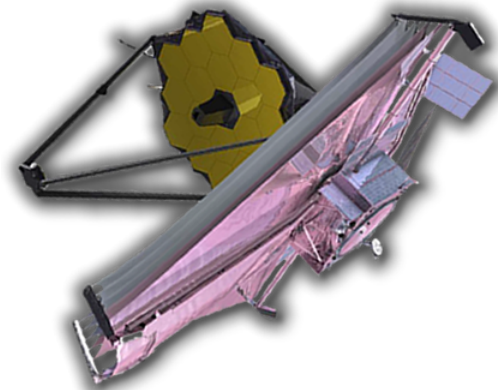


Source: NASA

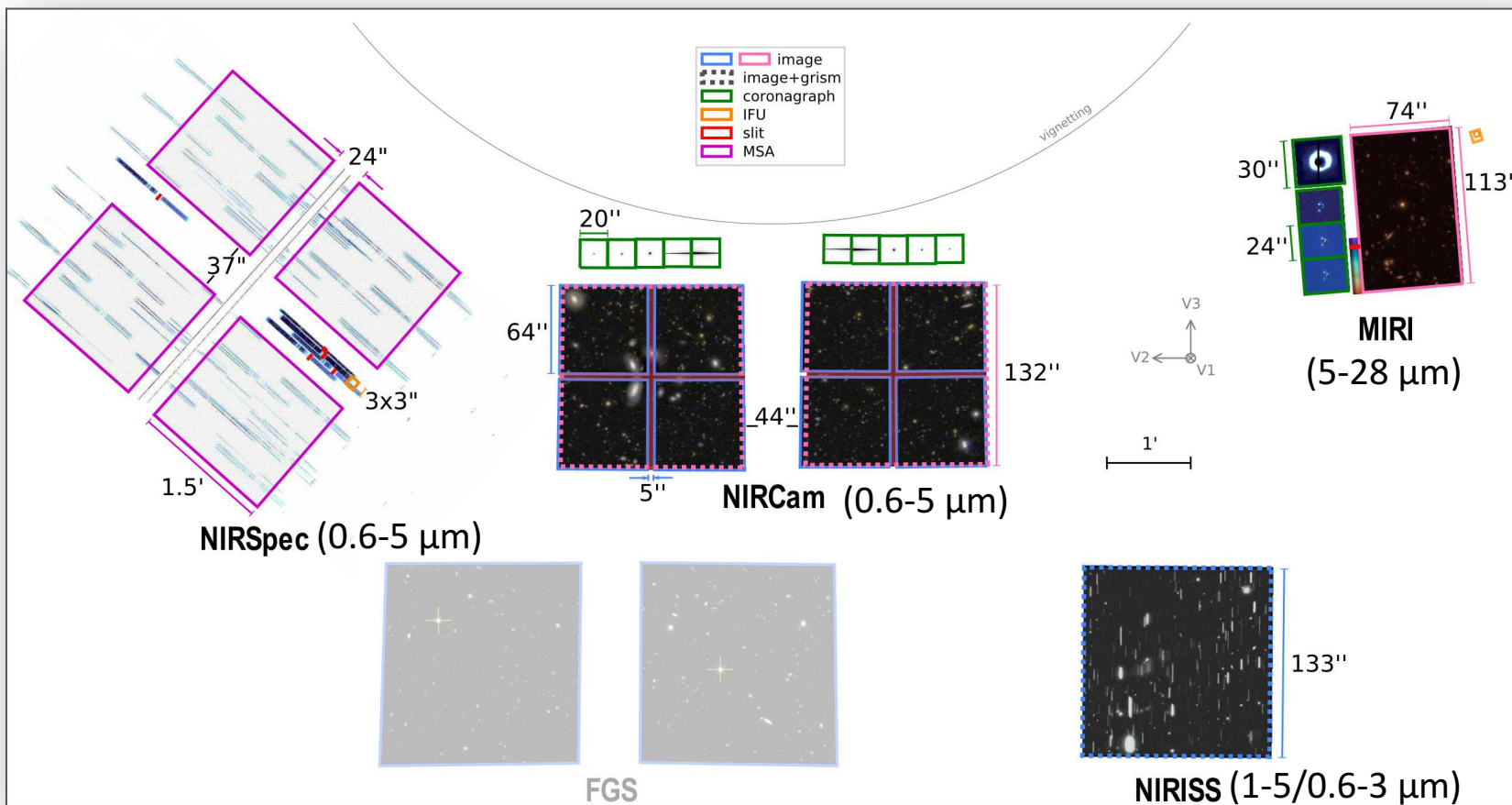


Deployable 6.5m telescope optimized for IR

Mission for 5 to 10 years



JWST 4 Scientific Instruments in the Focal Plan



The European Context



ESA contributes to 15% to JWST
with NASA and CSA

ESA is responsible to provide :

- ✓ NIRSpec (Airbus Defence and Space)
- ✓ Half of MIRI (Consortium of 10 European countries)

The French Context



Conclusions of Prospective INSU 2014

- ❖ Priority to be prepared to JWST

Comité Inter Organisme MIRI/JWST 2014

- ❖ Encourage national coordination

MICE Centre of Expertise for MIRI : <http://jwst.fr/>
(CNES, CEA/Sap, CNRS, OBSPM-LESIA, IAS, LAM)

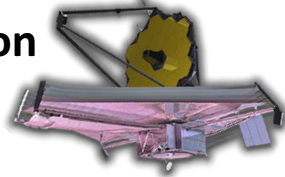
The French Context (extragalactic view)



✓ Contribution to JWST instrumentation

NIRSpec

- Phase-A (until 2004)
@LAM @CRAL
- Science support, Instrumentation Performance Simulator (IPS), test campaigns support
@CRAL
- Preparation for the NIRSpec exploitation (data treatment pipelines, hydro. simulations)
FP7-ITN, Elixir @IAP @CRAL



Predictions and catalog simulations

@CRAL with JWST/NIRSpec

@LAM with JWST/MIRI

✓ Long standing experience and know-how in large campaigns of galaxy deep fields

@LAM @CRAL @IAP

In MOS, PI of VIMOS and MUSE @ESO-VLT,

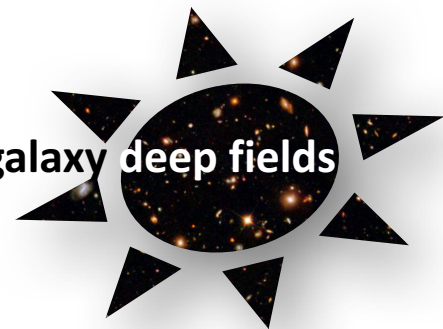
PI of GTO and LP observations

Involved in future MOS eg Euclid, PFS-Sumire, 4MOST, HARMONI, ...

Expertise in galaxy numerical simulations

Expertise in tools to extract galaxy physical parameters over large datasets

Expertise in spectroscopic databases



The Idea to create a National Service

Around the Extragalactic Deep Fields

No science can be made without a good knowledge
of other processed datasets with added value

magnitudes, morphologies, size, redshifts, spectral signatures,...
z_phot, SFR, stellar mass, dust, B/T, radius, velocities, environment, age, ...

All those data are published and mostly public, after a huge effort to release them.
The used data can be 10-15 years old

Nevertheless, catalogs are often

- exchanged from person to person
- done by instrumentation/observation
- sometimes no cross-matching, sometimes no value-added
- put on-line very late,....

- Same operation are repeated each time by new users, checking the catalogues, cross-matching, re-discovering the problems, re-extracting/calibrating, etc.
- Lack of proper documentation of the files, data without context
- Reproducibility?



Example of a strong French implication in HST-COSMOS 1000+02 field defined in 2000

VLT, VISTA, CFHT, Subaru, VLA, GALEX, HERSCHEL, SPITZER, XMM-Newton, Chandra, Laboca, ALMA...

and will be continued to be observed with the new facilities

Not exhaustive achieved work:

- ✓ zCosmos-VIMOS and FORS2 catalogues @LAM
- ✓ Mosaics from MegaCam (u+VIS), WIRCam (HK), UltraVISTA @Terapix @IAP
- ✓ Photometric multi-lambda catalogs (CFHT+Subaru+VISTA) @IAP
- ✓ GALEX UV catalogs with Emphot @LAM
- ✓ Morphologies catalog @LAM @OBSPM
- ✓ Flux and EW catalogs @IRAP
- ✓ Mag and stellar mass @LAM
- ✓ HEDAM database for Herchel-Cosmos @LAM
- ✓ zphot @LAM
- ✓ Empirical simulated catalog for Euclid @LAM

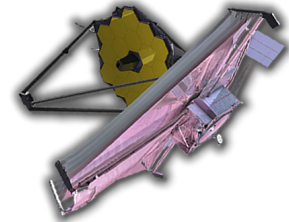


→ no real French global visibility for this work, no proper citation in 2015, more 560 papers on COSMOS with > 24000 citations

ANO4

JWST Extragalactic Deep Legacy Surveys

To structure the French community



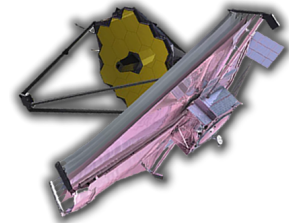
Proposition (July 2015) & Labelisation ANO4 (19 December 2015)

- Labs involved in NIRSpec : CRAL, LAM & IAP
 - Resp. national ANO4 : L. Tresse
 - Piloting Committee with members proposed by PNCG : T. Contini, S. Peirani
 - Recruitment CNAP in sept. 2016 @IAP : Atek Hakim
-
- OSUL @CRAL Resp. local J. Blaizot
 - OSU Pythéas @LAM Resp. local O. Le Fèvre
 - OSU @IAP Resp. local S. Charlot

ANO4

JWST Extragalactic Deep Legacy Surveys

To structure the French community



Missions

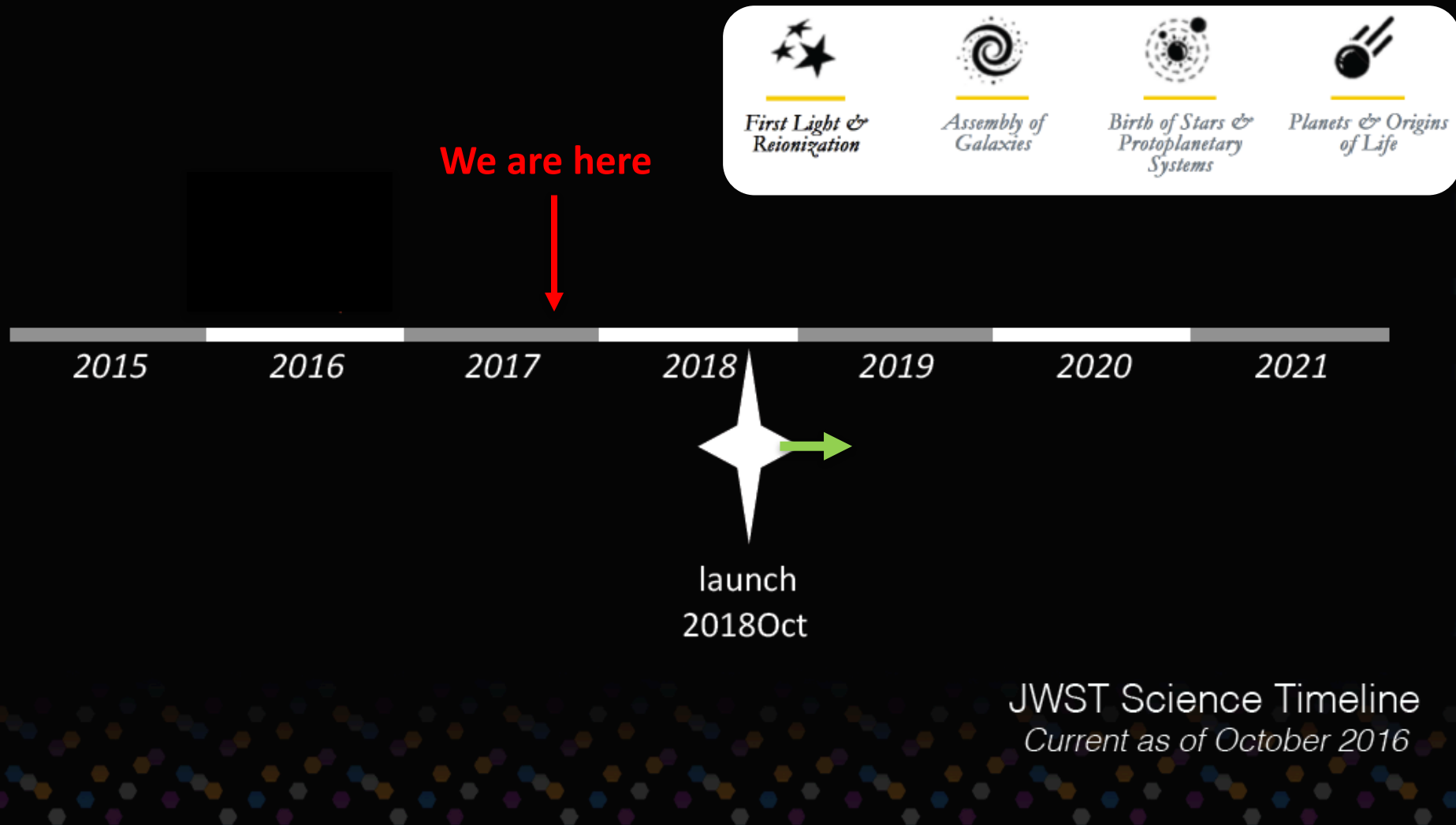
- Être proactif dans la définition de la stratégie des champs profonds
- Préparer la stratégie d'observation notamment avec des simulations
- Accompagnement des observations / Piloter des campagnes de suivi
- Établir des catalogues à valeur ajoutée avec documentation JWST
- Proposer des ateliers envers la communauté PNCG

Utilisation / mise en place de logiciels communautaires

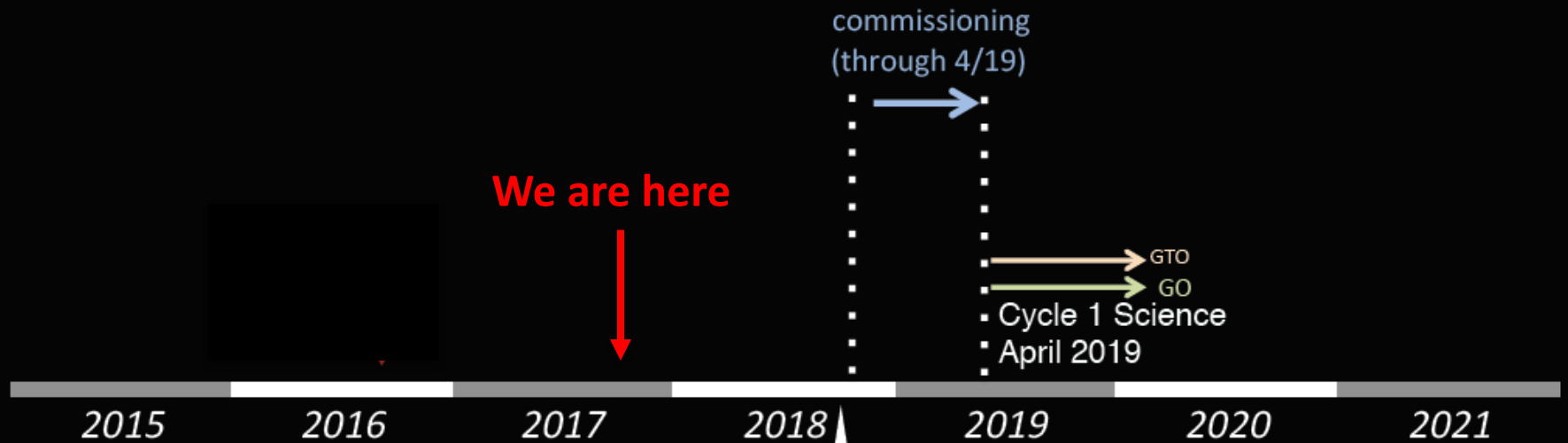
Production de catalogues de simulation

A very long-term lasting goal to establish comprehensive datasets on deep fields for future facilities as eg ELT, TMT, SKA...and after JWST

JWST Launch – shifted by Spring 2019



Commissioning – shifted also

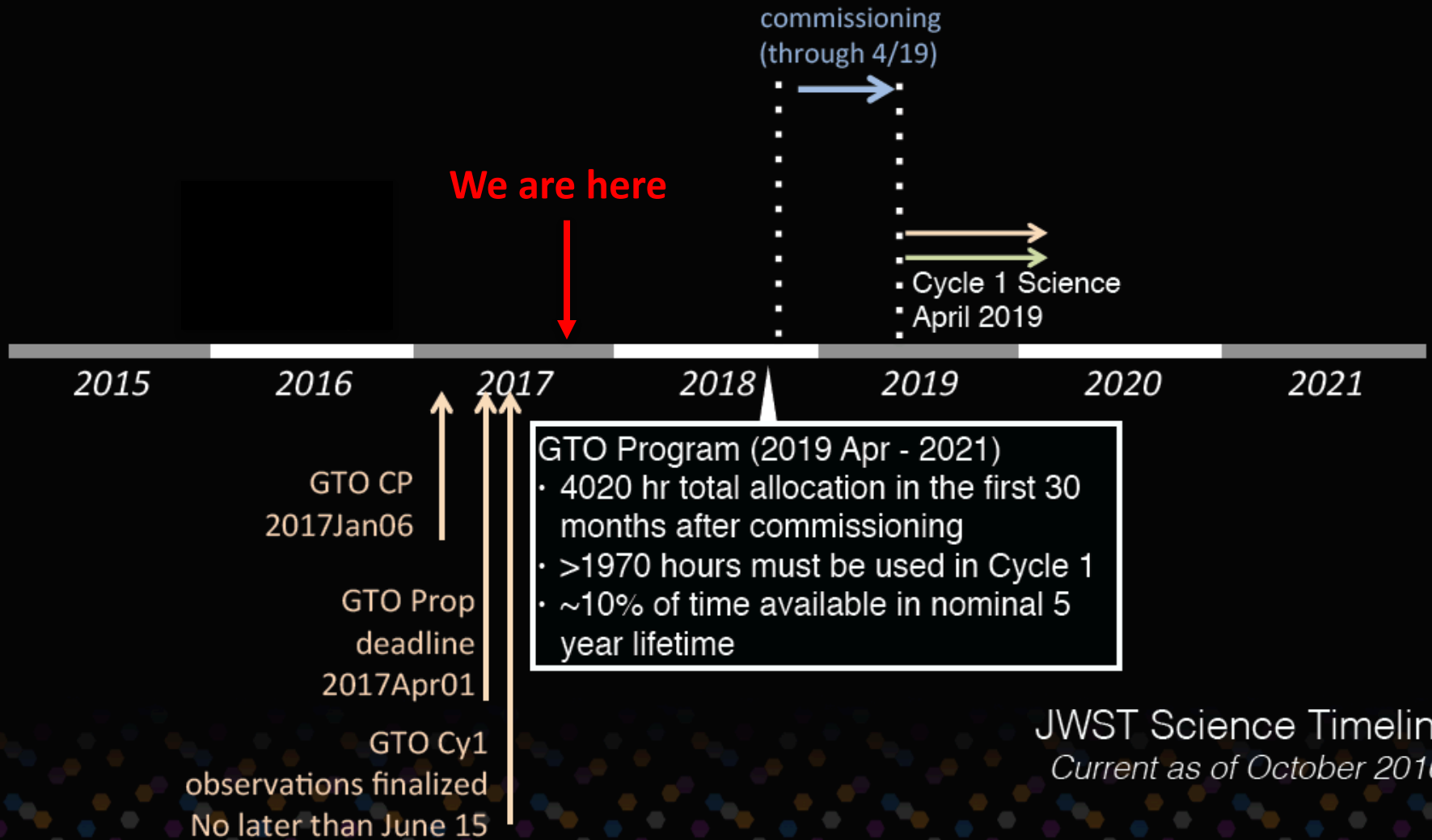


- Commissioning (2018 Oct - 2019 Apr)
- full schedule of deployments & checkout activities
 - limited set of science calibration observations possible

launch
2018Oct

JWST Science Timeline
Current as of October 2016

Guaranteed Time Observations (GTO)



General Observer (GO)

One month shift
2018Apr6

commissioning
(through 4/19)

GO CP
2017Nov30

GO Cy1
deadline
2018Mar02

We are here

TAC
2018May

- GO Program (2019 Apr -)
- Similar to GO programs from HST, Spitzer, and Chandra
- Flexible to accommodate programs with a range of sizes
- Support of archival and theory programs

2015

2016

2017

2018

2019

2020

2021

GTO CP
2017Jan06

GTO Prop
deadline
2017Apr01

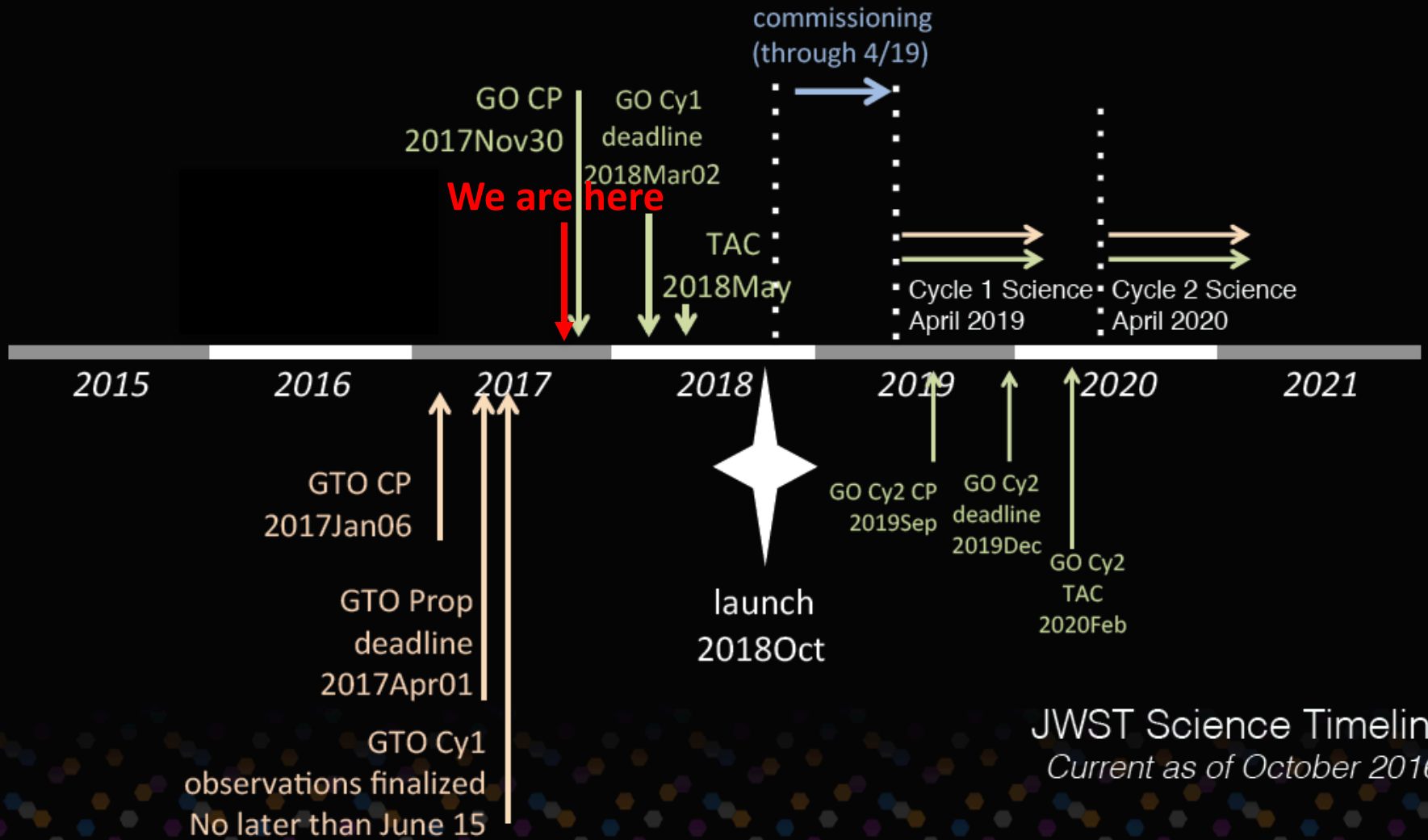
GTO Cy1
observations finalized
No later than June 15

launch
2018Oct

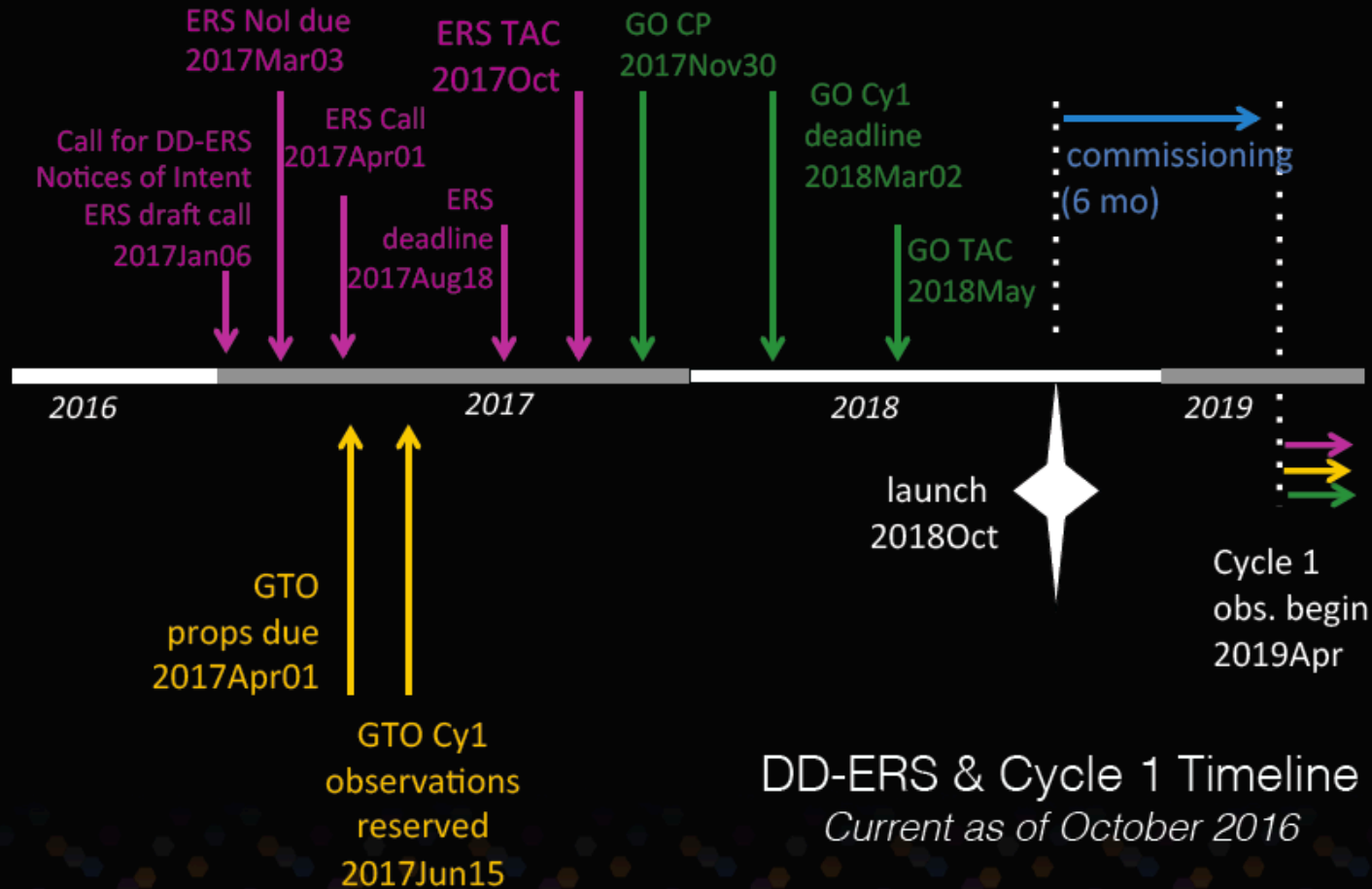
GTO programs have priority on specific observations of specific targets. A full list for Cycle 1 will be made available to the community no later than June 15 2017.

JWST Science Timeline
Current as of October 2016

General Observer (GO) Cycles 1 & 2



Early Release Science (ERS)



Overview of some GTO Extragalactic Fields

- ✓ **NIRCam-NIRSpec** (500hrs) Galaxy mass assembly imaging and spectroscopy in CANDELS

Wedding Cake (shallow, medium, deep) @R=100 (150 gal) & @R=1000, 2700 (50-70 gal)

Deep AB=29.8, $2 < z < 14$, 300+ spectra 46 arcmin² in GOODS-S & HUDF

Medium AB=28.8, $2 < z < 14$, 5000+ spectra 190 arcmin² in GOODS-S & GOODS-N

Wide AB=24, $2 < z < 4$, 7000+ spectra 270 arcmin² in UDS, COSMOS, AEGIS, GOODS-S, GOODS-N

IFU (300 hrs) EGS & COSMOS & GOODS-S

- ✓ **MIRI** (60hrs)

HUDF 5.6 μ m imaging – AB=28.3 - Ha to z=7.5

- ✓ **NIRISS** (450hrs)

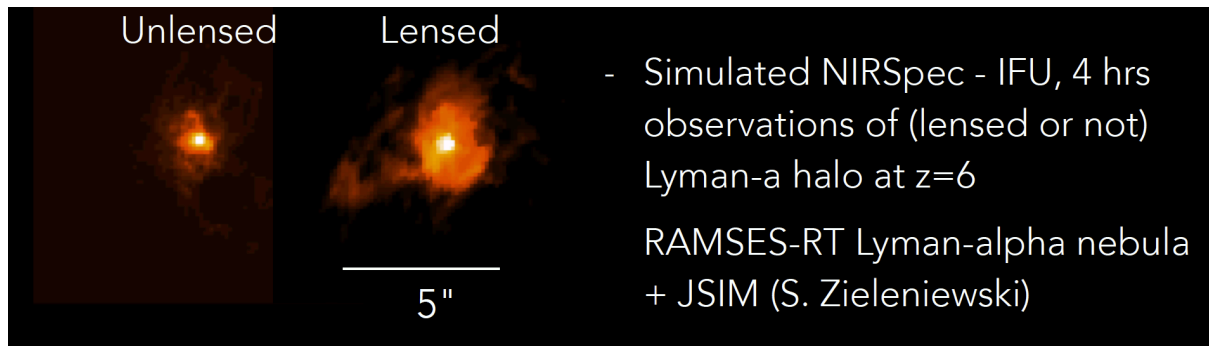
High-z galaxies (~200 hrs)

Six lensing clusters (FF & MACS, $0.35 < z < 0.7$)

→ **Data released on year after? Or less?**

Some On-going Work

- Done in Feb 2017 - BEAGLE has been inserted in GAZPAR@LAM
GAZPAR-ANO5 : interface to derive photometric redshifts or the physical parameters
(Cigale, LePhare, Beagle, to come HyperZ)
- Need of JWST-IFU simulations including gas dynamics to test IFU related tools
@CRAL Simulations of LAE at $z>3$ (RAMSES-RT– RASCAS, SPHINX project PI Rosdahl)
Datacubes injected in the IPS and JSIM @CRAL
@IAP @CRAL input and output datacube analyses



Courtesy J. Richard

- Need to be prepared for GO Cycle 1 or 2
- Should be ready to treat ERS data, immediately public



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Thank !