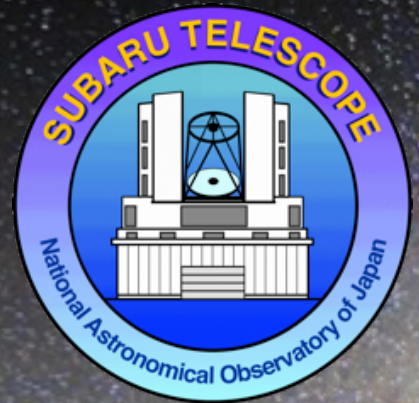


ULTIMATE-Subaru Collaboration Meeting 2018 (2018/1/16)

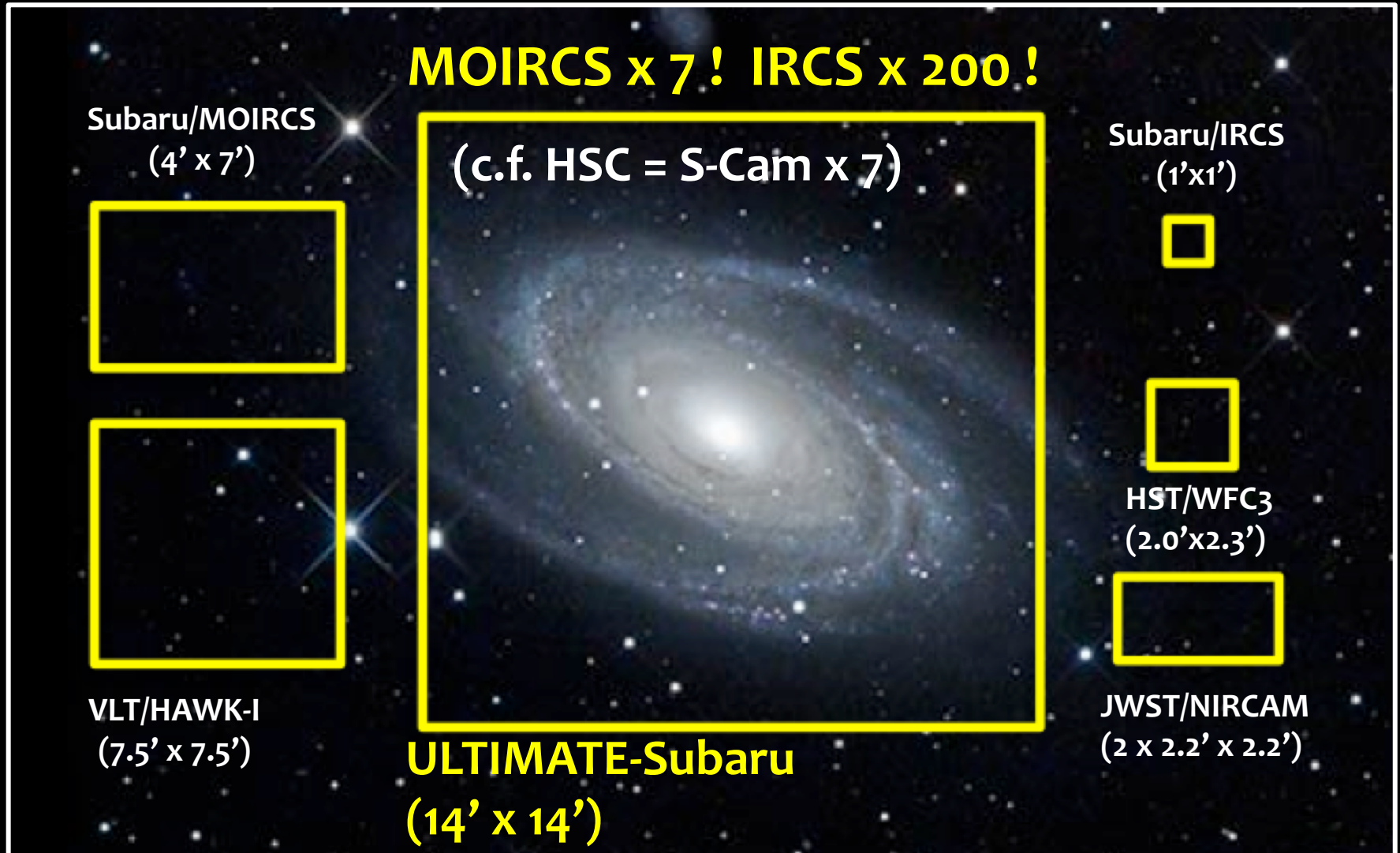
ULTIMATE-Subaru Science Team Status

Yusei Koyama (Subaru Telescope)

ULTIMATE-Subaru Science Team

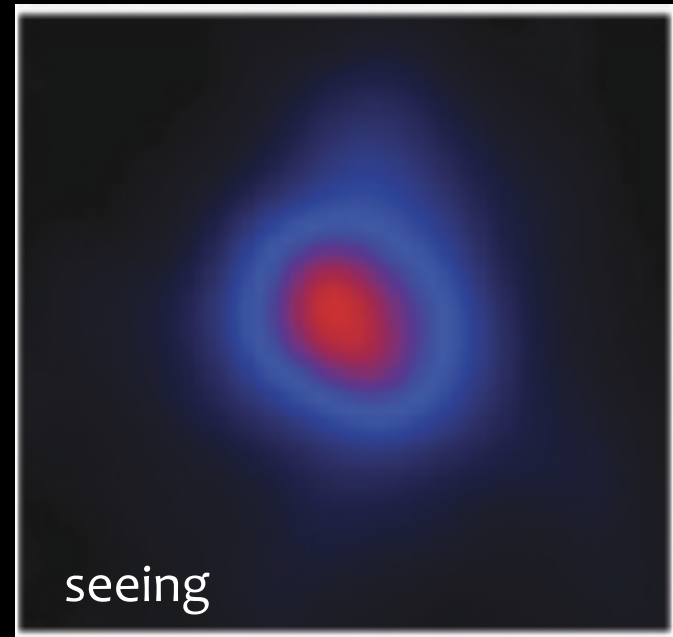
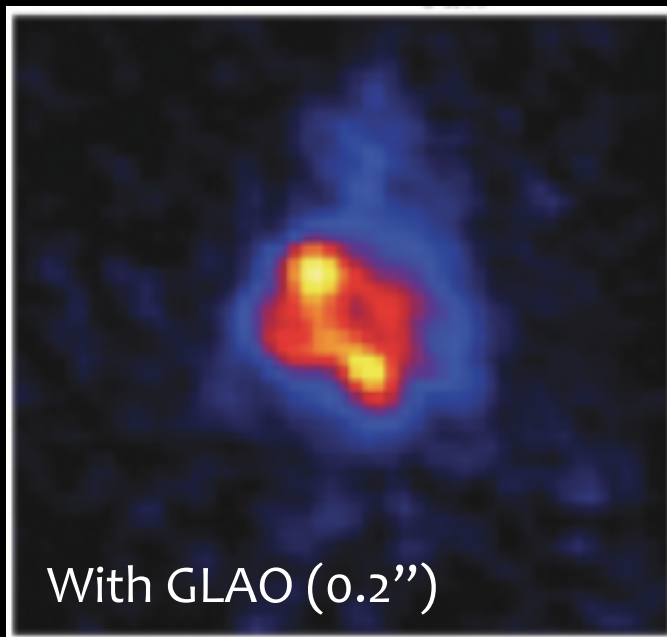


ULTIMATE-Subaru: GLAO + new IR inst.

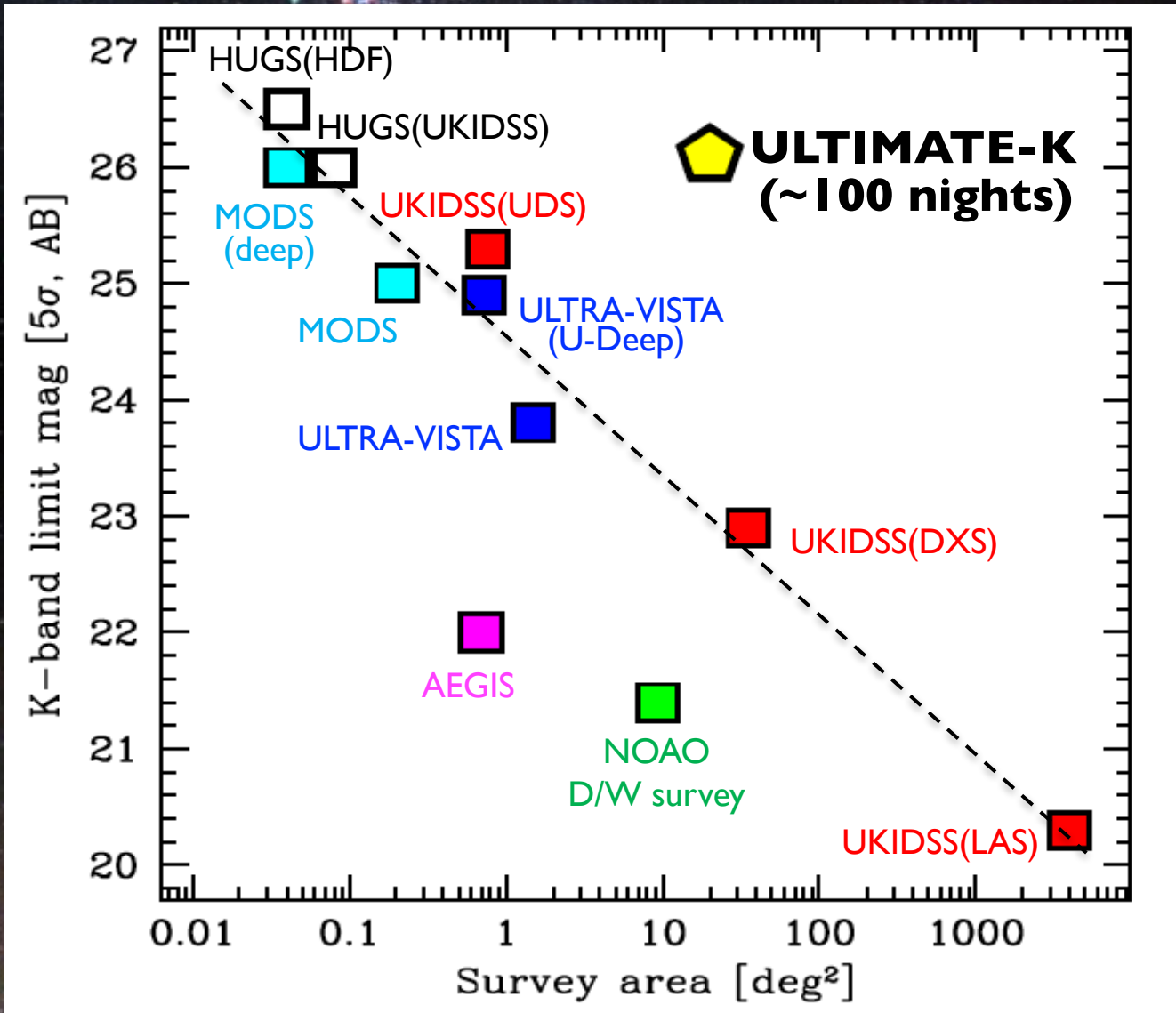


Uniqueness of ULTIMATE

- Wide FoV ($\sim 15'$), everywhere on sky
- High spatial resolution ($\sim 0.2''$ @ K-band)
 - Comparable to HST/WFIRST. Note: $0.32''$ at VLT site
- Improved sensitivity (~ 0.75 mag deeper)



K-band deep/wide survey

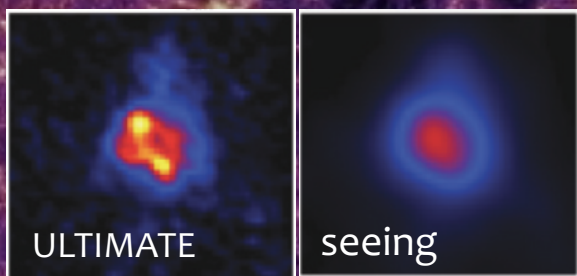
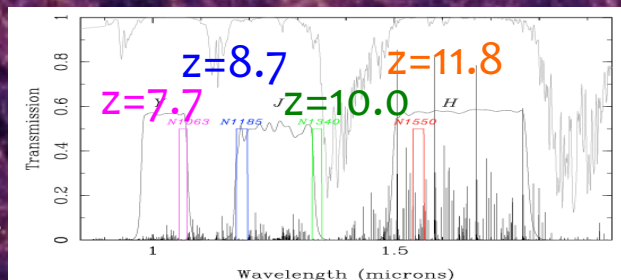


ULTIMATE-Subaru key science (mostly with high-z imaging)

“Birth, Life, Death” of galaxies in the cradle of large-scale structure

I. First galaxies (birth)

- Unprecedentedly deep NB imaging to detect galaxies a “cosmic dawn” ($z \gg 7$).
- Go beyond the depths of JWST.
- Extension of HSC optical NB survey

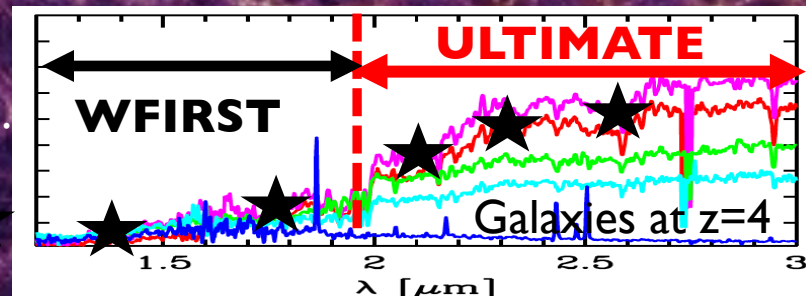


2. Stellar build-up (life)

- Origin of Hubble sequence: bulge, disk, and black hole growth
- Deep & sharp & panoramic NB imaging and 3-D spectroscopy of galaxies at “cosmic noon” ($z=0.5-3.5$)

3. Quenching (death)

- Tracking down the “passive” galaxies to $z \sim 5$ with deep BB/MB imaging (in K-band).
- Environment of dead galaxies: do first galaxies die in isolation or in clusters? ★
- Great synergy with WFIRST.



ULTIMATE-Subaru science team

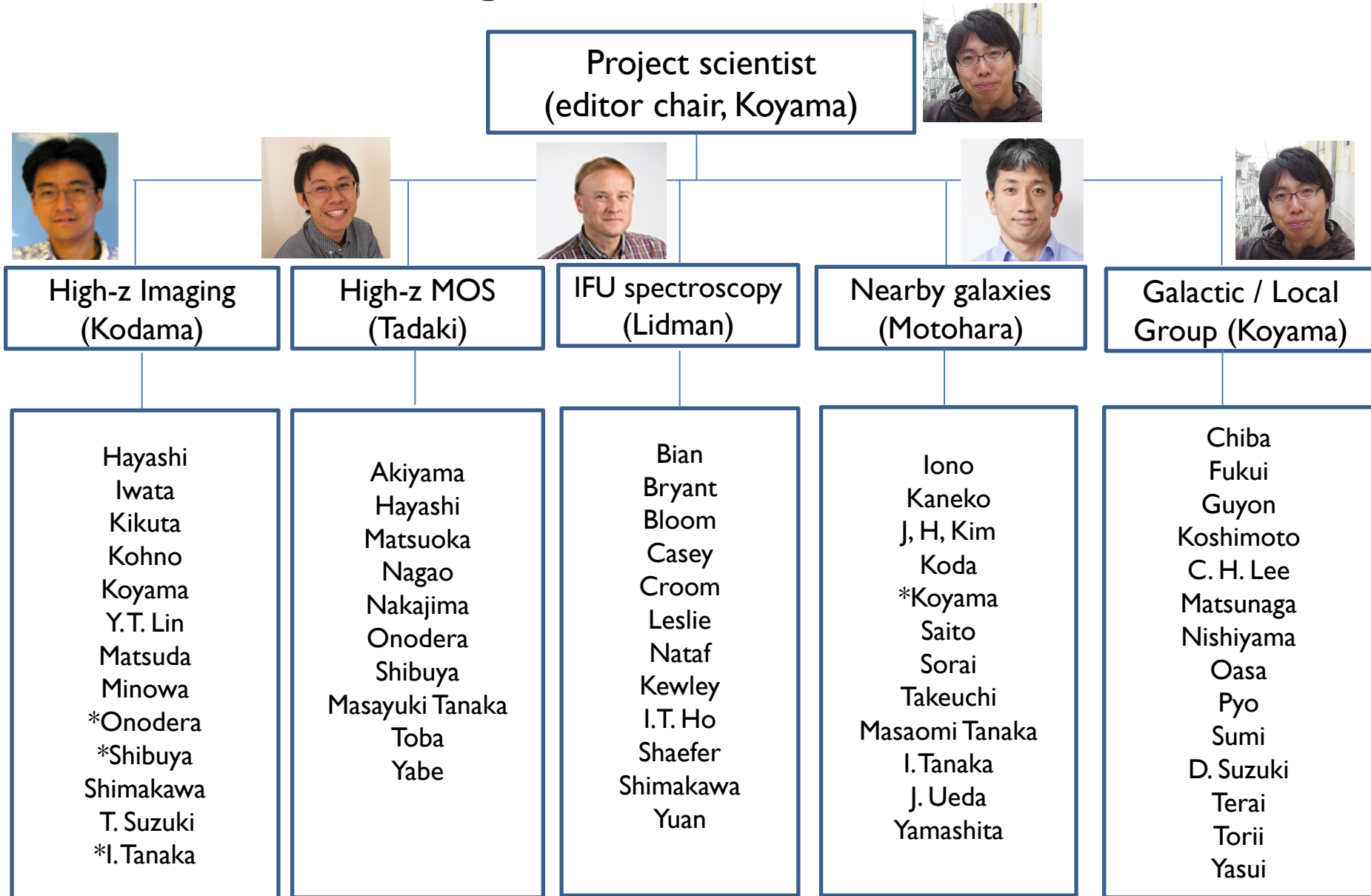
Many thanks for the contribution in Study Report, workshops, white papers.

Masayuki Akiyama (Tohoku)
Fuyan Bian (ANU)
Jessica Bloom (Sydney)
Julia Bryant (AAO)
Andy Casey (ANU)
Masashi Chiba (Tohoku)
Scott Croom (Sydney)
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Daisuke Iono (NAOJ)
Masatoshi Imanishi (NAOJ)
Ikuru Iwata (Subaru)
Masao Hayashi (NAOJ)
I-Ting Ho (ANU)
Hiroyuki Kaneko (NAOJ)
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Kazufumi Torii (NAOJ)
Junko Ueda (CfA/Harvard)
Takuji Yamashita (Ehime)
Kiyoto Yabe (IPMU)
Chikako Yasui (NAOJ)
Tiantian Yuan (ANU)

Science team organization toward CoDR2018



Science workshops / community meetings

Subaru next generation AO workshop
(2011/9/8-9, Osaka Univ. Nakanoshima Center)

More general, including MOAO



Study Report 2012

Subaru GLAO Science Workshop 2012

(2012/10/17-18, Subaru Hilo Office)

Kick-off meeting (invitation only)



Subaru GLAO Science Workshop 2013

(2013/6/13-14, Hokkaido University)

wider community including Canadians, key science, imager/MOS



ULTIMATE-Subaru Science Workshop 2014

(2014/7/28-29, NAOJ Mitaka)

wider community including Australians, starbug & IFU system



Study Report 2016

ULTIMATE-Subaru Science Workshop 2016

(2016/6/16-17, NAOJ Mitaka)



Science white paper 2017

ULTIMATE-Subaru Collaboration Meeting 2018

(2018/1/15-16, NAOJ Mitaka)

Science workshops / community meetings

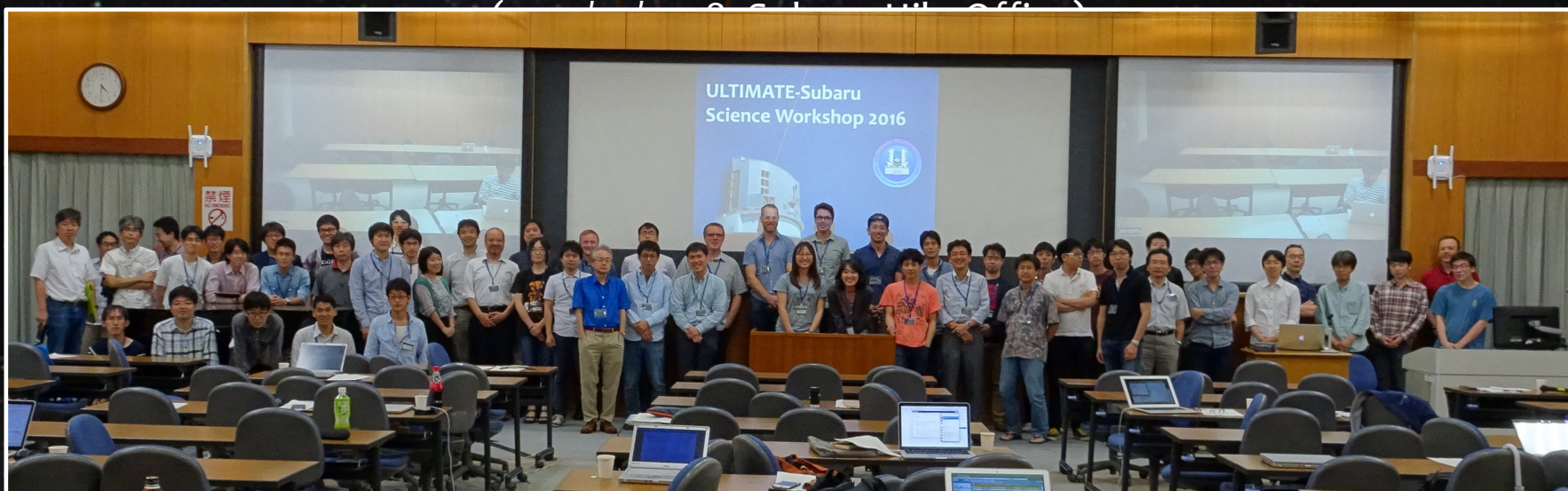
Subaru next generation AO workshop
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Study Report 2012

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Study Report 2016

ULTIMATE-Subaru Science Workshop 2016

(2016/6/16-17, NAOJ Mitaka)

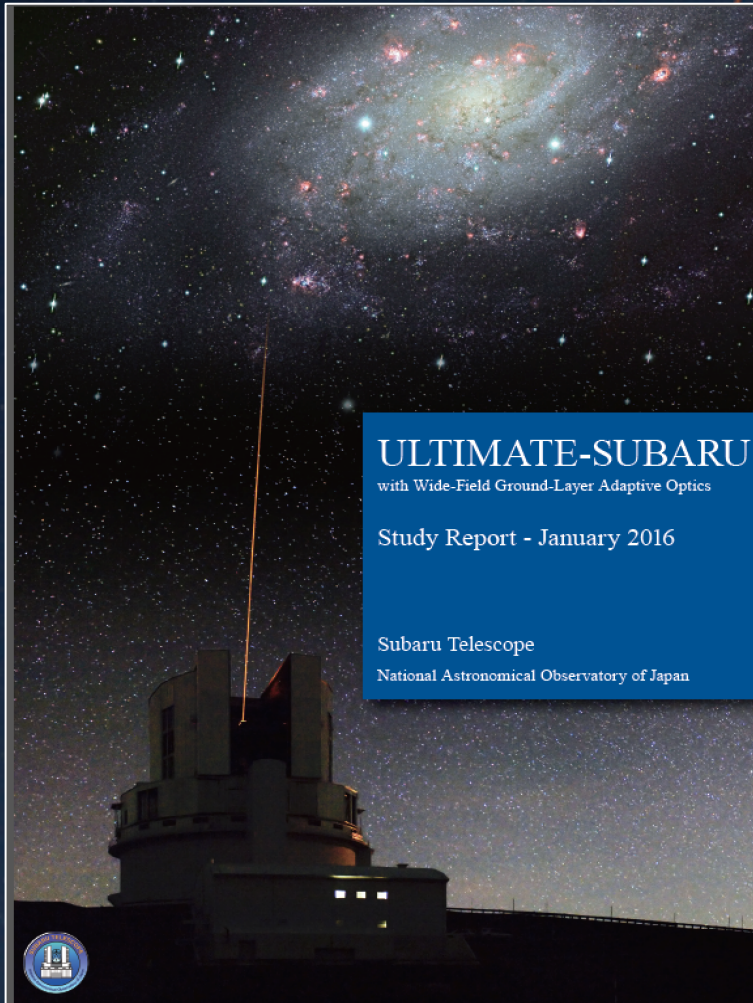


Science white paper 2017

ULTIMATE-Subaru Collaboration Meeting 2018

(2018/1/15-16, NAOJ Mitaka)

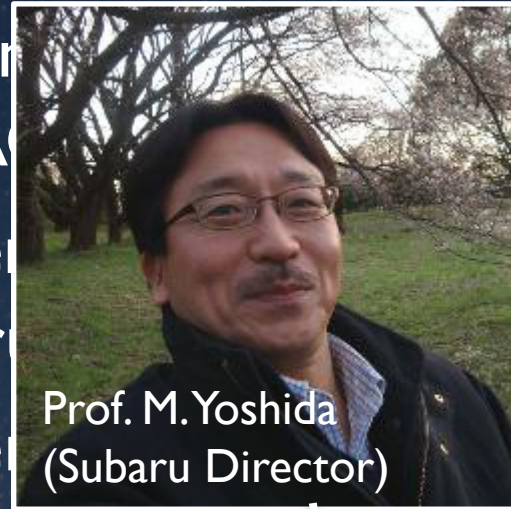
ULTIMATE Study Report 2016



ULTIMATE Study Report (2016)

<http://www.naoj.org/Projects/newdev/ngao/>

- Summary of activity & NgAO 2011.
- External review on best ULTIMATE.
- External review in Feb. 24 (5 reviewers).



Prof. M. Yoshida
(Subaru Director)



Feb. 24 @ Hilo

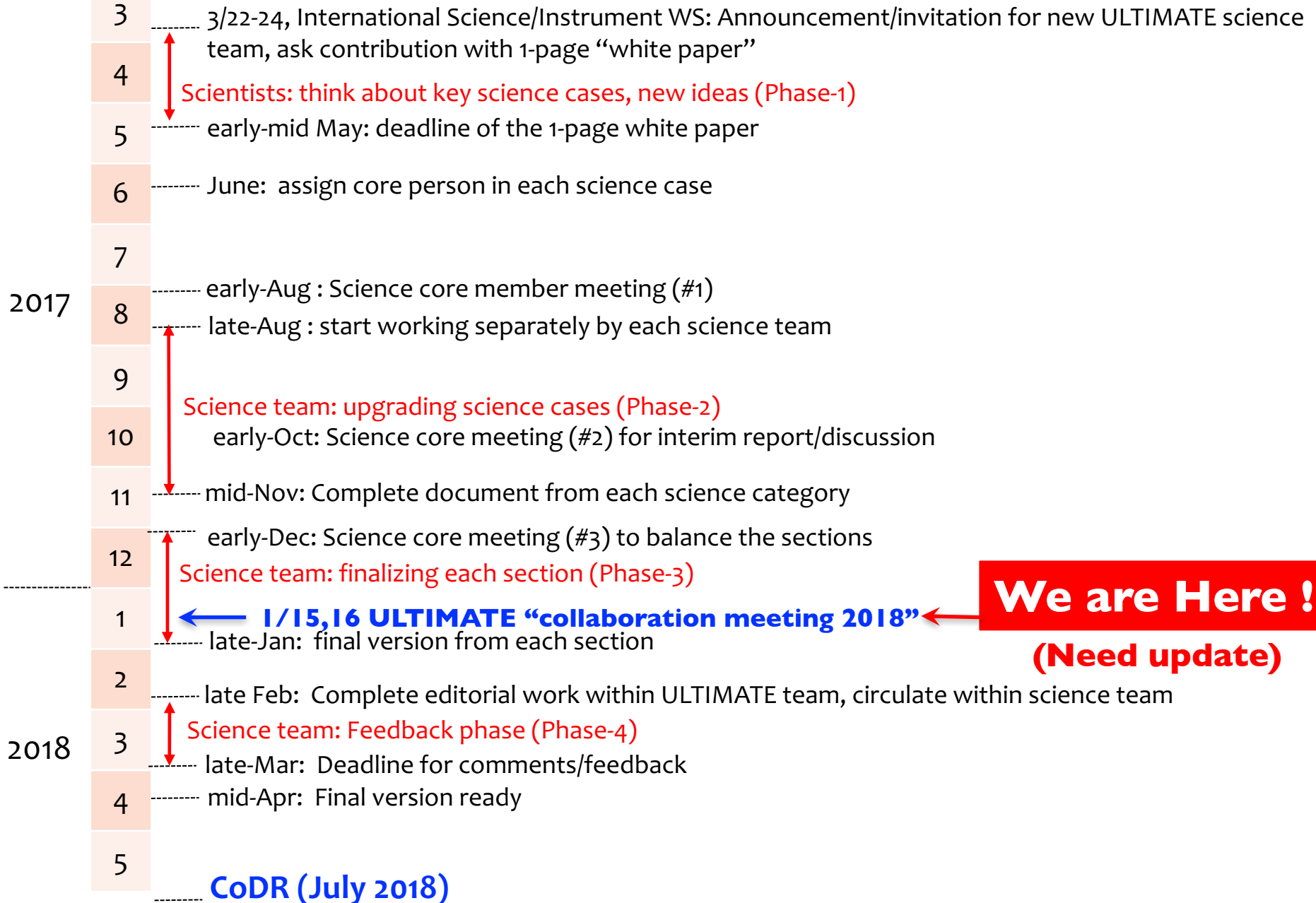
Reviewers' recommendation

<https://www.naoj.org/Projects/newdev/ngao/20160113/index.html>

1. Need to describe more clearly that ULTIMATE can still lead the proposed science cases in ~ 10 years from now, and which science can be done only with ULTIMATE.
2. Galactic/stellar science cases are in a preliminary stage and should be expanded, by involving a broader participation from the community.
3. Clarify which science cases indeed need this GLAO spatial resolution and which only require for improved sensitivity.
4. The requested numbers of nights and their impact to open-use should be justified based on the minimum requested sample properties (e.g., sizes and depths).

We are now trying to upgrade our science cases toward the CoDR.

Work schedule toward CoDR 2018



International collaboration

- Taiwan: 
 - Recent visit to ASIAA by Ohashi, Minowa, Koyama (Oct 2017)
 - Y.T. Lin listed scientists who can help our science case development.
 - Long collaboration history between Subaru/NAOJ and Taiwan
- Australia: 
 - Recent visit to AAO/ANU by Yoshida, Ohashi, Minowa, Ono (Nov 2017)
 - Official (short-term) collaboration in AO development part.
 - Great contribution on IFU science cases in Study Report.
- Canada: 
 - Recent visit to Waterloo/Toronto by Iwata, Kodama, Koyama (Nov 2017)
 - Showed interests in wide-field imager (development & science) from the very beginning of the project (~2013)

Need more? I think it's best to establish the strong network of ULTIMATE scientists in the four countries.

Discussion Items (for later today)

- A/Is and (updated) timeline toward CoDR
- Identify weak points and missing science cases
 - Identify uniqueness & complementarity with space missions.
- How to establish network our science team
 - Broader support from the community.
 - Next science workshop in $\sim$ 1-year timescale?
- Summarize requirements for ULTIMATE instruments
 - Sensitivity, imaging filter, tunable filter, specification of MOS/IFU...
- Strong (and realistic) survey design
 - Rough idea for what we will do in Phase-I, II, III.
- Smaller issues (good-looking website, science team wiki...?)