



Atacama
Large
Millimeter/submillimeter
Array



NAOJ
National Astronomical
Observatory of Japan



EA ALMA Future Development

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2017 ALMA/45m/ASTE Users Meeting





ALMA Development Program

- The ALMA Development Program supports the continued development and upgrades of hardware, software, and analysis tools for the ALMA project.
- Until now these funds have been used mainly to complete the complement of receiver bands.
- It is timely to define a new long-term development strategy for the upcoming decade and beyond, that will guide further advancements in ALMA's technical and scientific capabilities.



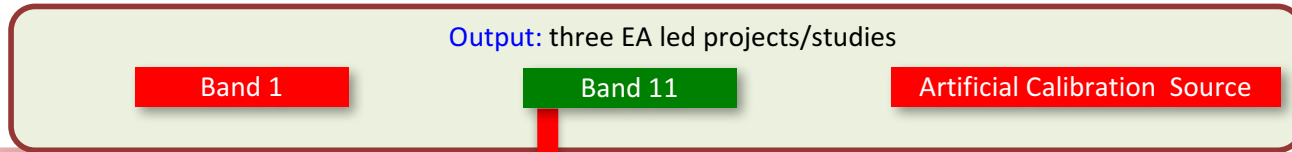
ALMA 2030

- As a first step, the ALMA Science Advisory Committee (ASAC) examined potential technical developments for long term ALMA development (“ALMA 2030” report).
- ASAC recommended, with no specific priority,
 1. Improvements to the ALMA Archive: enabling gains in usability and impact for the observatory
 2. Larger bandwidths and better receiver sensitivity: enabling gains in speed
 3. Longer baselines: enabling qualitatively new science
 4. Increasing wide field mapping speed: enabling efficient mapping.

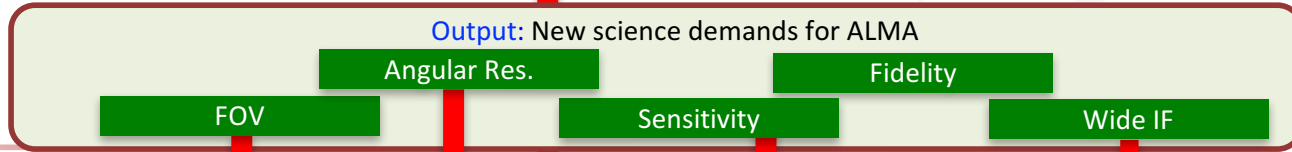


EA ALMA Development Workshops

2011
Development WS

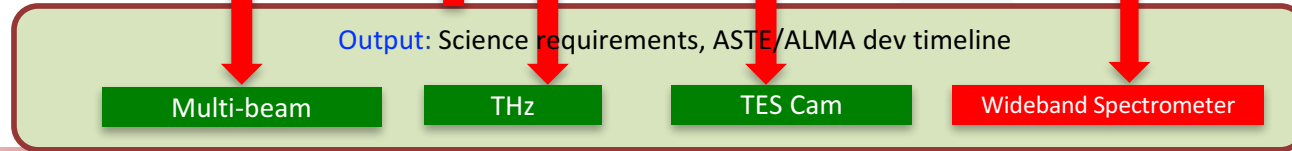


2013
Development WS



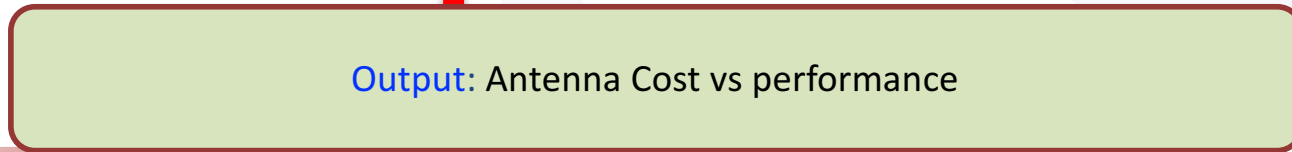
http://alma-intweb.mtk.nao.ac.jp/~diono/meetings/EA_Development_Meeting/

2014
ASTE/ALMA
Development WS



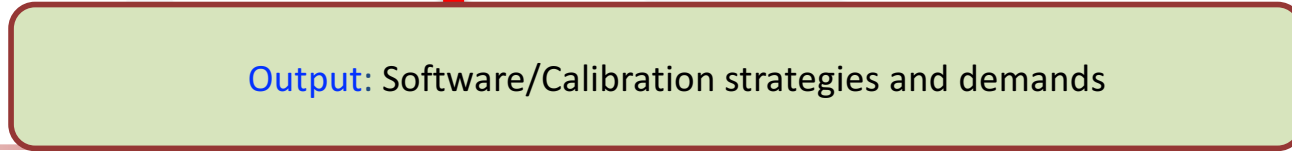
http://alma-intweb.mtk.nao.ac.jp/~diono/meetings/ASTE_ALMA_2014/

2015
Antenna Structure
Development WS



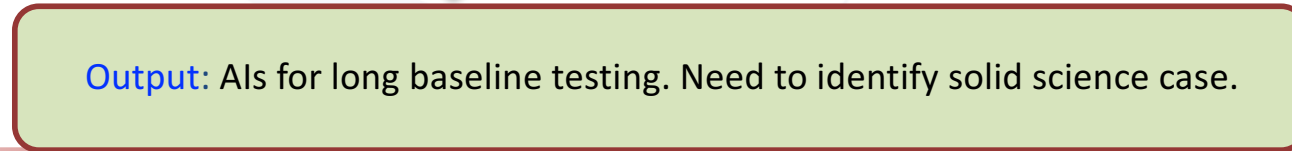
http://alma-intweb.mtk.nao.ac.jp/~diono/meetings/NRO_ALMA_2015/

2016
Development WS



http://alma-intweb.mtk.nao.ac.jp/~diono/meetings/NRO_ALMA_2016/

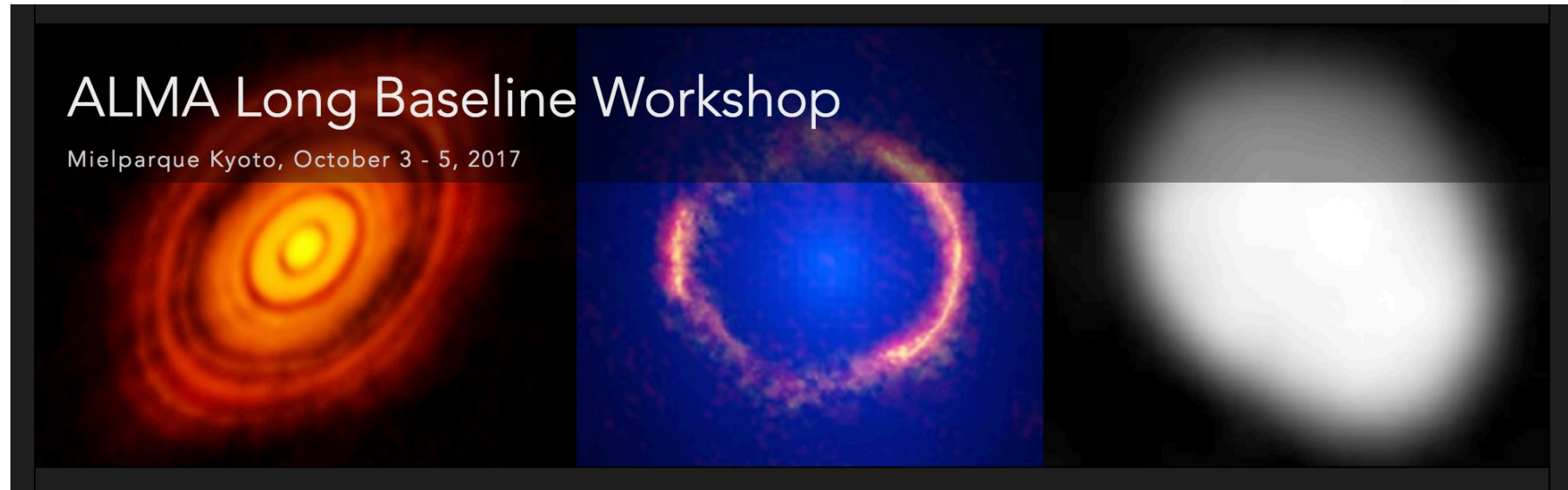
2017
Long Baseline WS
(Kyoto, Oct 3-5, 2017)



<http://alma-intweb.mtk.nao.ac.jp/~diono/meetings/longBL2017/>



Long Baseline Workshop



- Scope:
 - Review the high-resolution ALMA science results to date
 - Identify detailed science cases for future baseline expansion
 - Discuss the scientific and technical requirements such as angular resolution, number/size of antennas, sensitivity and operational frequency
 - Review the technical feasibility studies for longer baseline imaging



Long Baseline Workshop

- Output: Good kick-off meeting with excellent science/technical presentations
- Action Items
 - Science cases need to be updated as we get long (16km) baseline images
 - What is the killer science for 30-50km BL?
 - Need more long baseline tests (OSF-AOS)
 - Investigate image quality/fidelity at long BL
 - Calibration strategies (e.g. dry component, B2B transfer) need to be investigated further
 - Explore the possibility of writing a white paper (that includes a roadmap)





Priorities for EA

- Studies & Small Projects
 - ALMA Calibration Source
 - Polarization calibration at bands 3,6,7
 - High Critical Current Density (J_c) SIS Junction Device Development (including wideband RF/IF and THz devices)
 - GPU Spectrometer for TP array (with KASI)
 - Supplements the ACA correlator
- Projects
 - Band 1 project (lead: ASIAA, Collaboration: NAOJ, U of Chile, NRAO, HIA)
 - Baseline capability (35-50GHz)
- ASTE development project (but extendable to ALMA)
 - Multi-beam receiver (with KASI)