

The ALMA Development Program

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Board Resolution

The ALMA Board has charged the project to develop a long term ALMA Development Plan in consultation with the international astronomy community. The plan should set out the scientific context for transformational science with ALMA in 2020, in the era of for example JWST, ELTs and SKA, and the developments necessary to achieve this vision. The ALMA Board views this plan as having the utmost strategic priority, and is coordinating its development across the entire ALMA partnership.

The Process

- The idea is to do something similar to the Gemini Aspen process...
- Develop a scientific context document that says where ALMA should try and be scientifically in 2020
 - i.e. in the era of JWST, ELTs and SKA
- This should be a pan-chromatic perspective driven by where we see the science going
 - *perspective should incorporate ALMA's appeal to non-sub-mm/mm specialists*
- The resulting science perspective should inform the ALMA Board on the direction of technological R&D needed to allow ALMA to remain a transformational instrument well beyond 2020
- As such the process should be informed about the technical possibilities and their possible timescales – for example
 - All receiver bands – relatively easy
 - More antennas – simple but expensive
 - Wide field imaging utilizing focal plane arrays – difficult and expensive
- Produce an agreed long term development plan

Stage One: Preliminary Report

- The process of generating the ALMA Development Plan should be led by the JAO Project Scientist and the ASAC (with support from the Executives)
 - The ASAC should identify the scientific themes on which sub-groups will work (for example: star formation, galaxy formation etc)
 - This should become a formal ASAC charge and be reported to the Board at the April 2008 meeting
 - The ASAC should identify appropriate Chairs for each subgroup
- ALMA Workshop organized by JAO
 - Broad community involvement
 - Workshop follows the sub-group theme
- Sub-group Chairs, the ASAC and JAO produce the preliminary report

Stage Two: Regional Input

- Preliminary report distributed to Executives and used for any necessary regional activities
- Presented in appropriate forums in each region for further feedback
 - For example at the AAS meeting in the USA, ASJ meeting in Japan, and equivalent European meetings
- Sub-group Chairs, the ASAC and JAO produce the final report based on feedback

Stage Three: Implementation Plan

- The JAO and the Executives meet to develop an implementation plan
- This will include *inter alia*
 - Identify those items that can be implemented with relatively little R&D and for which cost estimates could be made relatively easily (e.g. more antennas, Band One)
 - Items that require a Phase One study in order to assess cost, risk and science return (e.g. sensitivity increases from improved front ends and/or increased IF bandwidth, new A/D systems etc)
 - Items that have very significant long potential but will require significant R&D before ever being feasible (e.g. focal plane arrays)
 - Estimated costs of implementation, including studies and long term R&D
- Plan is presented to the ALMA Board for review
- Agencies decide which components of the plan they wish to pursue

Stage Four: Implementation

- Board agrees a long term (five year?) program of work and associated funding
- JAO solicits a call for proposals from the Executives to carry out the plan
 - In Each region the exact role of the Executive is likely to be different
 - Depending on circumstances, the Executives could manage outsourced work, collaborate across a regional, national or international partnership, or carry out the work in-house
- Executives make proposals to the JAO carry out the work
 - May require regional processes (call for bids etc)
- JAO recommend a program of work to the ALMA Board

Timescales

- Stage One completes by end 2008
- Stage Two completes in time for the November 2009 Board
- Stage Three produces preliminary data in time for the March 2010 Board meeting
 - Detailed estimates in time for November 2010 Board
- Stage Four completes by November 2011
 - Any items needing early funding are identified and proposals brought forward to March 2011 Board (utilizing \$1.5M available in 2011)
 - Will require careful coordination to meet different regional constraints
- 2012 Development Program starts in earnest (\$3M)