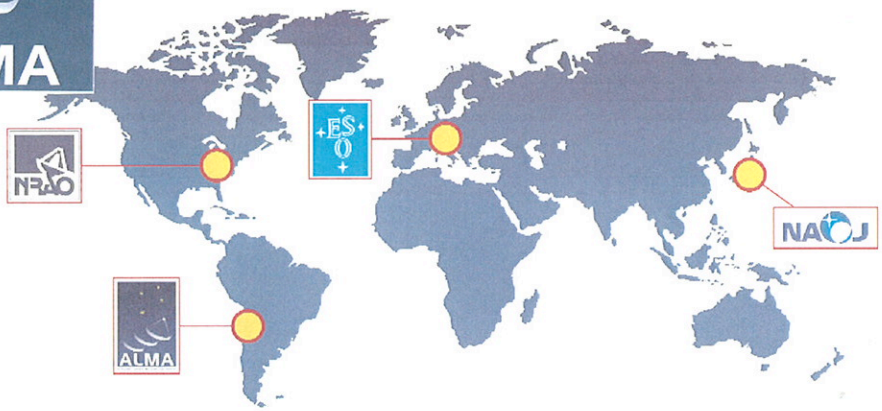
A Global Project



The Atacama Large Millimeter/ submillimeter Array (ALMA), an international astronomy facility, is a partnership of Europe, Japan, and North America in cooperation with the Republic of Chile.

ALMA is funded in Europe by the European Organisation for Astronomical Research in the Sourthern Hemisphere (ESO) and in Japan by the National Institutes of Natural Sciences (NINS) in cooperation with the Academia Sinica in Taiwan, and in North America by the U.S. National Science Foundation (NSF) in cooperation with the National Research Council of Canada (NRC).

ALMA construction and operations are led on behalf of Europe by ESO, on behalf of Japan by the National Astronomical Observatory of Japan (NAOJ) and on behalf of North America by the National Radio Astronomy Observatory (NRAO), which is managed by Associated Universities, Inc. (AUI).

Access to ALMA observing time by the North American astronomical community is through the North American ALMA Science Center (NAASC), based at the NRAO headquarters in Charlottesville, Virginia. The NAASC is operated by NRAO in partnership with the National Research Council of Canada. The ALMA data reduction pipeline will provide calibrated data and images to users, and an on-line archive will be maintained at the NAASC. Scientific advice on the operation of ALMA and the NAASC is provided by the ALMA North American Science Advisory Committee (ANASAC), which is composed of ~ 15 representatives from the North American astronomical community. Additional information is available on-line at *http://www.cv.nrao.edu/naasc*.

ALMA Timeline

1995 →	**NRAO/ESO/NAOJ joint site testing with Chile**
May 1998 →	**Start of Phase I (Design & Development)**
June 1999 →	**U.S. / European Memorandum of Understanding for Design & Development**
February 2003 →	**Final North American / European ALMA Agreement**
April 2003 →	**Testing of first prototype antenna begins at the ATF site in New Mexico**
October 2004 →	**Opening of Joint ALMA Office, Santiago, Chile**
July 2005 →	**North American contract for up to 32 ALMA production antennas**
October 2005 →	**Groundbreaking at 5000 m altitude ALMA Array Operations Site**
December 2005 →	**European contract for up to 32 ALMA production antennas**
July 2006 →	**Agreement signed by North America, Europe, and Japan**
March 2007 →	**"First Fringes" dectect by two linked antennas at the ATF**
April 2007 →	**Delivery of first ALMA production antenna to Chile**
2010 →	**Call for shared-risk Early Science proposals; Early Science**
2012 →	**ALMA Construction complete**

Specifications

		12 m Array	Atacama Compact Array (ACA)
Array	Number of Antennas	up to 64	12 (7 m) + 4 (12 m)
	Total Collecting Area	up to 7240 m^2	460 + 450 m^2
	Angular Resolution	0.02" (λ /1 mm)(10 km/baseline)	5.7" (λ /1 mm)
	Baseline Lengths	15 - 18 500 m	
Antennas	Diameter	12 m	7 m, 12 m
	Surface Precision	<25 μm	<20 μm, <25 μm
	Offset Pointing	<0.6"	<0.6"
Correlator	Baselines	up to 2016	120
	Bandwidth	16 GHz per baseline	16 GHz per baseline
	Spectral Channels	4096	4096

Receiver Bands

Band Number	Frequency Range (GHz)	Wavelength (mm)	Instantaneous Bandwidth (GHz)	Configuration
1	31.3 - 45.0	6.7 - 9.6	1 × 8	SSB
2	67 - 90	3.3 - 4.5	1 × 8	SSB
3	84 - 116	2.6 - 3.6	2 × 4	2SB
4	125 - 163	1.8 - 2.4	2 × 4	2SB
5	163 - 211	1.4 - 1.8	2 × 4	2SB
6	211 - 275	1.1 - 1.4	2 × 8	2SB
7	275 - 373	0.8 - 1.1	2 × 4	2SB
8	385 - 500	0.6 - 0.8	2 × 4	2SB
9	602 - 720	0.4 - 0.5	2 × 8	DSB
10	787 - 950	0.3 - 0.4	2 × 8	DSB

Bands 1 and 2 will be developed in the future.
SSB - single sideband
2SB - both sidebands detected separately
DSB - double sideband

ALMA Sensitivity Goals for the 12 m Array

For an integration time of 60 seconds, a spectral resolution of 1 km s^{-1}, the RMS flux density, ΔS, and brightness temperature sensitivity, ΔT, with a 64 antenna array and maximum baseline, B_{max}, will be:

Frequency (GHz)	Continuum ΔS (mJy)	Spectral Line ΔS (mJy)	B_{max} = 0.2 km Beam (arcsec)	ΔT_{cont} (K)	ΔT_{line} (K)	B_{max} = 14.7 km Beam (arcsec)	ΔT_{cont} (K)	ΔT_{line} (K)
110	0.047	7.0	3.18	0.0005	0.070	0.038	3.3	482
140	0.055	7.1	2.50	0.0005	0.071	0.030	3.8	495
230	0.100	10.2	1.52	0.0010	0.104	0.018	6.9	709
345	0.195	16.3	1.01	0.0020	0.167	0.012	13.5	1128
409	0.296	22.6	0.86	0.0031	0.234	0.010	20.5	1569
675	1.042	62.1	0.52	0.0108	0.641	0.006	72.2	4305

ALMA on the World Wide Web

www.cv.nrao.edu/naasc
www.alma.info

Front cover image: Artist's concept of the VertexRSI antenna (left foreground) and the AEM (right foreground) superposed on a photo of the ALMA site (Cerro Toco in background).

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