

## ALMA Construction Tasks in Green Bank, WV 2002-2010

ALMA Cost Data Sheet	Task Name	Labor (k\$)	Materials and Contracts (k\$)	Total Task (k\$)	Task Duration (years)
78A	Near-Field Measurement Equipment	\$150	\$100	\$250	2.5 y
81	Band 3 Machining: Optics, Feed, Polarizer	\$825	\$280	\$1,105	9 y
82	Band 3 Machining: Mixer Block & IF Ampl	\$140	\$15	\$155	1.5 y
85	Band 6 Machining: Optics, Feed, Polarizer	\$825	\$280	\$1,105	9 y
86	Band 6 Machining: Mixer Block & IF Ampl	\$140	\$15	\$155	1.5 y
169	LO Lab Equipment: CNC Milling Machine		\$100	\$100	
<b>TOTALS</b>		<b>\$2,080</b>	<b>\$790</b>	<b>\$2,870</b>	

## ALMA Construction Tasks in Socorro, NM 2002-2010

ALMA Cost Data Sheet	Task Name	Labor (k\$)	Materials and Contracts (k\$)	Total Task (k\$)	Task Duration (years)
127	LO Management/Subsystem Engineering	\$1,320	\$225	\$1,545	9 y
128	LO Reference Engineering Support	\$370	0	\$370	5y
139	Optical Fiber Receiver, LO Reference	\$400	\$1,300	\$1,700	2 y
140	Two-laser Generator, RF Synthesizer	\$100	\$250	\$350	0.4 y
141	Second LO Synthesizer	\$1,700	\$2,500	\$4,200	9 y
142	Fringe Generator	\$275	\$75	\$350	1.5 y
143	Central LO Reference Generator	\$60	\$40	\$100	0.25 y
144	Sampler Clock	\$425	\$425	\$850	2.3 y
145	Hydrogen Maser Frequency Standard	\$35	\$350	\$385	0.2 y
146	Power Supply Modules	\$325	\$200	\$525	1.5 y
147	LO Reference Production Supervision	\$600	\$40	\$640	2.5 y
148	LO Reference Production Test & Lab Equip	\$0	\$270	\$270	
			\$0		
170	Backend Management/Subsystem Engineering	\$1,400	\$270	\$1,670	9 y
171	Backend Engineering Support	\$150	\$0	\$150	4 y
172	Prototype System IF Down-converter	\$250	\$200	\$450	0.25 y
173	Prototype Digital IF Transmitters & Receivers	\$190	\$180	\$370	0.25 y
174	Backend Digitizer/Sampler Prototype	\$350	\$700	\$1,050	0.2 y
175	Backend Final Design & Documentation	\$130	\$0	\$130	0.25 y
176	IF Down Converter--Production System	\$1,900	\$5,800	\$7,700	9 y
177	Power Supply Modules	\$300	\$180	\$480	1.5 y
178	Production Test and Laboratory Equipment	\$0	\$400	\$400	
180	Digital IF Transmitters and Receivers	\$600	\$2,300	\$2,900	9 y
			\$0		
191	Software/Programming Management	\$1,225	\$0	\$1,225	9 y
191A	Computing Hardware	\$0	\$1,600	\$1,600	
192	Science Software Requirements	\$585	\$0	\$585	8 y
193	High Level Software Analysis and Design	\$325	\$0	\$325	4.5 y
194	Software Engineering	\$925	\$0	\$925	6 y
195	Common Software System	\$1,170	\$0	\$1,170	2 y
196	Control Software	\$1,200	\$0	\$1,200	3 y

197	Correlator Software	\$750	\$225	\$975	4 y
198	Pipeline Software	\$325	\$500	\$825	4 y
199	Archiving Software System	\$550	\$500	\$1,050	3 y
200	Telescope Scheduling Software System	\$330	\$0	\$330	2 y
201	Observing File Preparation System	\$330	\$0	\$330	6 y
202	Data Processing and Image Analysis System	\$525	\$0	\$525	2 y
	<b>TOTALS</b>	<b>\$19,120</b>	<b>\$18,530</b>	<b>\$37,650</b>	

## ALMA Construction Tasks in Charlottesville, VA 2002-2010

ALMA Cost Data Sheet	Task Name	Labor (k\$)	Materials and Contracts (k\$)	Total Task (k\$)	Task Duration (years)
8	Management of ALMA Antenna Contract	\$1,500	\$300	\$1,800	9 y
70	Build SIS Mixer Fabrication Equipment	\$85	\$700	\$785	2 y
71	Build SIS Mixer Test Dewar	\$170	\$350	\$520	2 y
75	Build Wafer Evaluation Test Sets	\$60	\$90	\$150	0.5 y
76A	General SIS Mixer Test Equipment	\$0	\$130	\$130	0 y
77A	SIS Fabrication Test and Measure Equip	\$100	\$600	\$700	0.5 y
79	Signal and LO Sources	\$200	\$550	\$750	2 y
130	Millimeter LO Drivers Engineering Support	\$550	\$50	\$600	2 y
131	LO Multiplier Chain Engineering Support	\$700	\$900	\$1,450	2.5 y
133	Band 9 (602-720 GHz) Front End LO	\$150	\$50	\$200	0.5 y
134	Band 7 (275-370 GHz) Front End LO	\$150	\$50	\$200	0.5 y
154	72-95 GHz LO Source	\$700	\$1,500	\$2,200	5 y
155	100-120 GHz LO Source	\$700	\$1,500	\$2,200	5 y
158	LO Multiplier: Final Design Documentation	\$150	\$0	\$150	0.5 y
159	Band 3 (89-116 GHz) Receiver LO	\$125	\$100	\$225	1 y
160	Band 6 (211-275 GHz) Receiver LO	\$800	\$150	\$950	5 y
161	Band 9 (602-720 GHz) Receiver LO	\$1,200	\$300	\$1,500	8 y
162	Band 7 (275-370 GHz) Receiver LO	\$1,200	\$300	\$1,500	8 y
169	LO Test Equipment Facilities	\$50	\$600	\$650	0.5 y
182-189	Design and Build ALMA Digital Correlator	\$9,600	\$7,400	\$17,000	9 y
205B	Construction Phase System Engineering	\$2,000	\$0	\$2,000	9 y
<b>TOTALS</b>		<b>\$20,190</b>	<b>\$15,620</b>	<b>\$35,660</b>	