

Memorandum

2003-Sep-16

TO:

ALMA IPT Leaders and Deputies

FROM:

Richard Simon

SUBJ:

ALMA Milestones 2003-Sep-16

This document contains the following memoranda:

(1) ALMA Milestone Performance through 2003-Sep-12

This 17-page memo summarizes the overall project status, comparing our current progress to the baseline adopted in February 2003. It includes various charts and tables summarizing our progress, as well as a 6 page table listing all Level 1 and Level 2 milestones, as currently scheduled.

(2) ALMA Milestone Issues

This 6-page memo identifies critical issues and problems that were identified during the recent review of ALMA milestones. This list is not necessarily complete – there may be some critical issues not listed. It is also possible that some of the problems identified are not critical issues, since they have either been resolved or represent a misunderstanding which should be clarified.



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Memorandum

2003-Sep-12

TO:

ALMA Management IPT

FROM:

Richard Simon

SUBJ:

ALMA Milestone Performance through 2003-Sep-12

The attached charts and tables summarize the milestone performance to date of the ALMA project, compared to the baseline plan adopted in 2003 February. This memo focuses primarily on Level 1 and 2 milestones. The statistical summaries should be interpreted with care, since they do not fully account for the relative importance of various milestones – some Level 2 milestones, for example, are more critical than others. Following the statistical summaries, a table summarizing all scheduled and completed milestones for 2002 through 2004 is included.

Briefly, the ALMA project has achieved 44 of the 70 Level 1 and Level 2 milestones originally scheduled to have been accomplished by now. Performance to date graphs imply that the project is now ~5 months behind the baseline schedule adopted 7 months ago. The current schedule predicts that this schedule deficit will be essentially eliminated by late 2004.

The ALMA Baseline: Level 1 milestones for ALMA were tentatively agreed upon during the third quarter of 2002 (initial drafts of the ALMA Project Plan). At that point, detailed planning and scheduling started in earnest. Formal adoption of the Plan occurred in February of 2003. At that time, the baseline milestone plan for ALMA was formally adopted, consisting of

- 10 Level 1 milestones (specified in the Project Plan),
- 324 Level 2 milestones (controlled at the JAO level), and
- 142 Level 3 milestones (internal milestones used by the IPTs).

At the time of adoption, 11 of the Level 2 milestones and 9 of the Level 3 milestones had been accomplished. The smaller number of Level 3 milestones, as compared to Level 2, is due to two factors: detailed planning at Level 3 is still on going, and Level 3 milestones are intended to focus only on the next 12 months or so.

Current planning: As of this writing, the current milestone plan incorporates 521 milestones: 10 Level 1 milestones (unchanged), 306 Level 2 milestones, and 205 Level 3 milestones. Changes in the milestone plan occur for many reasons, including on going planning, adjustments in the assigned level of various milestones, and adoption of new milestones as detailed planning proceeds. The milestone plan for ALMA is actively maintained, so that it presents as accurate a picture as possible of the project planning. For each milestone there is a one-page description,

with a log kept of any changes or adjustments made to each milestone. More detailed comments on particular milestones are also incorporated into the plan, as they are received.

Statistical measures of performance: The attached charts and tables summarize the performance of the project to date, as compared to the baseline plan adopted in February. Each of the charts and tables is explained briefly below.

(1) ALMA: Performance Compared to Plan

This chart compares the Level 1 and 2 milestones accomplished thus far, and the schedule for future Level 1 and 2 milestones, to the schedule initially adopted in 2003 February. The top (blue) line presents the number of milestones scheduled to be accomplished as a function of time from the baseline plan. The solid (green) line shows the current (2003 August) milestone plan. The difference between the two curves is caused by delays or rescheduling of various milestones. The red dotted curve shows the actual milestones accomplished to date (through 2003-Aug-28).

(2) ALMA Milestones: Difference between Actual Date and Scheduled Date

This bar chart summarizes the delays experienced for completed milestones. 18 milestones were accomplished within one week of their baseline schedule; other milestones were delayed various amounts. The average delay for all milestones completed to date is 30 days. The average delay for milestones completed since the adoption of the baseline in mid 2003 February is 43 days.

(3) Milestone Changes and Revisions

The 4 tables on this page and the following page summarize the Level 1 and 2 milestones which have been rescheduled or otherwise changed, as compared to a selected reference plan and/or the February 2003 baseline. Thus, the first table, (Delayed Milestones (Level 1& 2 only, excluding completed milestones), lists all milestones which have been delayed as compared to the baseline, and shows both recent changes (since 2003-June) and the total effect of all changes since the baseline was adopted. The remaining 3 tables list milestones which have been deleted, added, or changed to a different level. For example, milestone 5.260.9104 was deleted because it essentially duplicated a milestone in the Management IPT.

(4) Milestone Progress by IPT

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This table presents 9 charts (two pages) which break down the performance compared to the baseline, by IPT.

(5) ALMA: EU Milestones Compared to Plan

This is the first of 4 charts which break down the performance compared to the baseline, according to which executive is responsible for which milestone. This chart summarizes performance and plans for milestones identified as European responsibilities. For the sake of clarity, the responsibility for each milestone was assigned to one of the following: Europe, North America, Shared (by Europe and North America), or the Joint ALMA Office.

Note: The formal assignment of responsibility for individual milestones may be subject to change.

(6) ALMA: NA Milestones Compared to Plan

This chart summarizes performance and plans for milestones identified as North American responsibilities.

(7) ALMA: Shared Milestones Compared to Plan

This chart summarizes performance and plans for milestones identified as having shared responsibility between Europe and North America.

(8) ALMA: JAO Milestones Compared to Plan

This chart summarizes performance and plans for milestones for which the Joint ALMA Office has primary responsibility.

(9) Scheduled Milestones

This table summarizes all milestones in the current (2003aug28a) milestone plan, sorted by year scheduled and by Level. The large concentration of Level 3 milestones in 2003 is a natural consequence of the short term focus of Level 3 milestones.

(10) Completed Milestones

This table summarizes the milestones which have been completed to date. A total of 41 Level 1 and Level 2 milestones have been accomplished thus far by ALMA. 3 Level 2 milestones have been accomplished in the past month.

(11) Late Milestones

"Late" milestones are those which have not been completed, and for which the scheduled date is past. While in principle there should never be any late milestones, in practice the necessary updating and adjustments may lag slightly. In some cases, the milestones are being carried as "late" until a reliable date is available.

(12) Level 1 and 2 Milestones accomplished

The IPTs in ALMA are responsible to the Management IPT and the JAO for Level 2 milestones, just as the Executives and the JAO are responsible to the Board for Level 1 milestones. Thus, from the perspective of the JAO and the Management IPT, performance on Level 1 and 2 milestones is or paramount importance. This table summarizes the completion dates for the 41 Level 1 and 2 milestones which have been accomplished thus far, with the average delay (compared to the baseline plan) for completed milestones.

(13) Milestone delays (Compared to 2003-Feb Baseline)

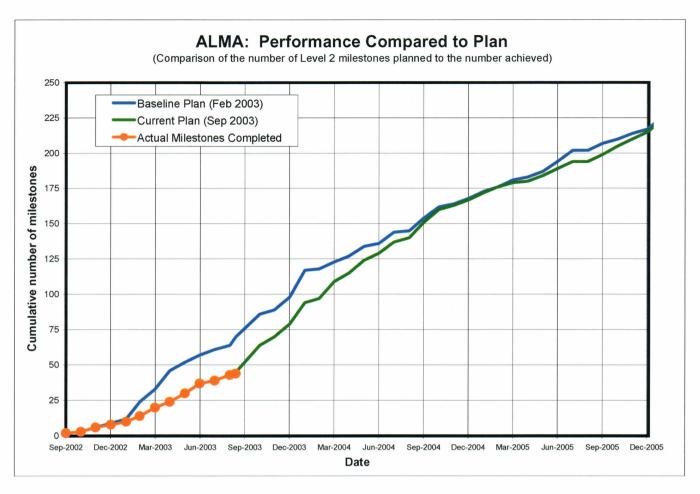
This table summarizes the delays for ALMA milestones in the current milestone plan, as compared to the baseline plan. For example, of the 33 milestones accomplished thus far this year, 9 of them were delayed between 31 and 60 days. For the remainder of 2003, 13 of the milestones scheduled are expected to be delayed by 121 days or more, as compared to the 2003 February baseline. This table also shows the effect that the current plan has on future milestones.

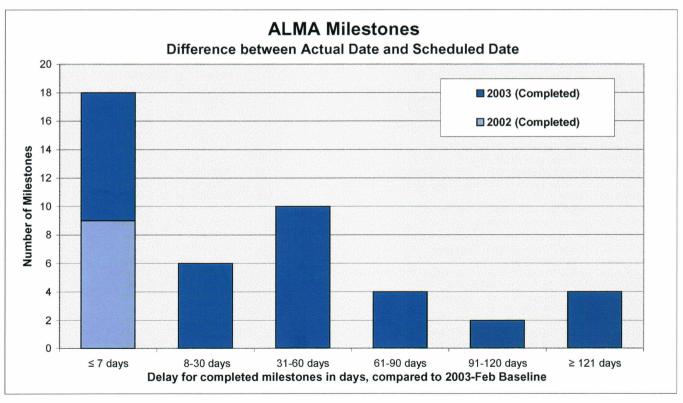
(14) ALMA Milestone Summary

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This 7 page table presents a one line summary for all Level 1 and Level 2. The assignment of "Responsibility" is tentative and subject to review. The "Delay" listed is relative to the baseline plan adopted 2003 February.

The current plan brings the overall plan back on schedule, as compared with the project baseline, by roughly 2005. However, an additional schedule gap opens during mid-2005, predicting that the project will fall temporarily behind schedule, by several months, during the latter half of 2005.





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Milestone Changes and Revisions: Current Plan (2003sep12b) compared to selected reference plan (2003jun01b) and Baseline plan

Delayed Milestones /Level 1 & 2 only excluding completed milestones):

| | | | Current Plan | | Relative Dela | Control of the Control of the Control |
|----------|--------------------------|---|----------------------------|--------------------|------------------------|---------------------------------------|
| | WBS | Milestone | 2003sep12b | | | Baseline |
| 1 | 1.010.8105 | Designation of responsibility for Phase 2 development work elements in Europe | 2003-Sep-15 | 2 Delay | 94 | 137 |
| 2 | 1.010.8122 | Executives submit 2004 budget and financial projections to JAO | 2003-Sep-01 | 2 Late | - 127 | 212 |
| 3 | 2.025.8222 | AOS Foundations NA CDR | 2003-Sep-30 | 2 Delay | 127 | 213 |
| 4 | 2.025.8224 | AOS Foundations NA Central Cluster Construction Tender Docs Complete | 2004-May-30 | 2 Delay | 320 | 411 |
| 5 | 2.025.8226 | AOS Foundations NA Central Cluster Construction Contract Signed | 2004-Nov-30 | 2 Delay | 426 | 426 |
| 6 | 2.025.8228 | AOS Foundations NA Central Cluster Provisional Acceptance | 2007-Jun-30 | 2 Delay | 730 | 730 |
| 7 | 2.025.8250 | AOS Buildings NA Foundations/Envelope CDR Complete | 2003-Oct-31 | 2 Delay | 123 - | 213 289 |
| 8 9 | 2.025.8252 | AOS Buildings NA Foundations/Envelope Construction / Tender Docs Complete | 2004-Mar-15 2004-Sep-15 | 2 Delay 2 Delay | - 259 | 259 |
| 9 10 | 2.025.8254 2.025.8258 | AOS Buildings NA Foundations/Envelope Construction Contract Signed AOS Buildings NA Foundations/Envelope Provisional Acceptance | 2004-Sep-15 2005-May-15 | 2 Delay 2 Delay | 25 9 257 | 259 |
| 11 | 2.025.8260 | • | 2004-Apr-30 | 2 Delay | 243 | 243 |
| | | AOS Buildings Finish & Installations NA CDR Complete | • | • | | |
| | 2.025.8262 | AOS Buildings Finish & Installations NA Construction / Tender Docs Complete | 2004-Aug-31 | 2 Delay | 275 | 275 |
| | 2.025.8264 | AOS Buildings Finish & Installations NA Construction Contract Signed | 2005-Feb-28 | 2 Delay | 242 | 242 |
| | 2.025.8266 | AOS Buildings Finish & Installations NA Provisional Acceptance | 2005-Dec-31 | 2 Delay | 184 | 184 |
| | 2.025.8294 | Construction Road Opening EU Provisional Acceptance | 2003-Nov-30 | 2 Delay | 61 | 61 |
| | 2.025.8306 | Access Road EU Construction / Tender Docs Complete | 2003-Oct-15 | 2 Delay | 91 | 91 |
| | 2.025.8334 2.025.8340 | Contractors Camp Initial Occupancy OSF Facilities Phase 1 (Tech area) EU Design/Eng Contract Awarded | 2004-Jan-01 2003-Oct-01 | 2 Delay | 63 122 | 63 122 |
| | 2.025.8342 | OSF Facilities Phase 1 (Tech area) EU CDR Complete | 2003-061-01 2004-Jan-15 | 2 Delay 2 Delay | 122 | 122 |
| | | • | | • | | |
| 20 | 2.025.8344 | OSF Facilities Phase 1 (Tech area) EU Construction / Tender Docs Complete | 2004-May-01 | 2 Delay | 122 | 122 |
| 21 | 2.025.8346 | OSF Facilities Phase 1 (Tech area) EU Construction Contract Signed | 2004-Oct-01 | 2 Delay | 183 | 183 |
| | 2.025.8348 | OSF Facilities Phase 1 (Tech area) EU Provisional Acceptance | 2006-Feb-01 | 2 Delay | 185 | 185 |
| 23 | 2.025.8360 | Freeze Fiber Optics and Electrical Specifications | 2003-Dec-31 | 2 Delay | 184 | 274 |
| 24 | 2.025.8362 | Fiber Optic Cables and Electrical Cables in Chile, N.A. | 2004-Sep-30 | 2 Delay | 15 | 15 |
| | 2.025.8372 | ALMA Project Power Supply Plan Approved | 2004-Jan-31 2004-Mar-31 | 2 Delay | 153 | 153 91 |
| 26 27 | 2.025.8374 | ALMA Permanent Power Supply Tender Docs Complete ALMA Permanent Power Supply Contract Signed | 2004-Mai-31 | 2 Delay 2 Delay | 91 92 | 92 |
| | 2.025.8378 | Provisional Acceptance Power Supply Contract Phase 1 | 2005-Sep-30 | 2 Delay | 92 | 92 |
| 29 | 3.035.8510 | Complete Technical Performance Report-VertexRSI Antenna | 2003-Dec-10 | 2 Delay | 153 | 265 |
| | | · | 2003-Dec-10 | - | 95 | 135 |
| 30 | 3.035.8530 | Shared Access AEC Antenna (Preliminary Acceptance) | | 2 Delay | | |
| 31 | 3.035.8540 | Provisional Acceptance of AEC Antenna | 2003-Nov-21 | 2 Delay | 85 | 120 |
| | 3.035.8545 | Complete Technical Performance Report-AEC Antenna | 2004-Jan-21 | 2 Delay | 82 | 120 |
| 33 | 3.045.8524 | Prototype Antenna released to Contractor for Refurbishment / Transport to Chile CFT/RFQ Bid Package Submitted to Project Office (AEC/VertexRSI) | 2004-Aug-28 | 2 Delay | 35 | 31 122 |
| 34 35 | 3.045.8525 3.045.8535 | Issue CFT/RFQ for Production Antenna Design(s) | 2003-Sep-30 2003-Oct-31 | 2 Delay 2 Delay | 35 35 | 123 |
| | 3.045.8550 | Closing Date for Production Antenna Bids (Competitive Tender) | 2004-Feb-28 | 2 Delay | 36 | 123 |
| 37 | 3.045.8560 | Bid Evaluations Due to Project Office | 2004-Apr-30 | 2 Delay | 35 | 94 |
| | 3.050.8565 | Sign Contract for 31+1 North Am. Production Antennas | 2004-Jul-28 | 2 Delay | - | 61 |
| 39 | 3.050.8575 | Sign Contract for 32-Euro Production Antennas | 2004-Jul-28 | 2 Delay | - | 59 |
| 40 | 3.065.8555 | Nutator Critical Design Review Completed | 2004-Oct-28 | 2 Delay | - | 386 |
| 41 | 3.070.8569 | Transporter Critical Design Review Complete | 2003-Dec-17 | 2 Delay | 26 | 277 |
| 42 | 4.075.8990 | Front end sub-system Delta PDR | 2003-Dec-01 | 2 Delay | 91 | 91 |
| 43 | 4.075.8995 | All FE Contracts / Agreements in place | 2003-Nov-01 | 2 Delay | 124 | 214 |
| | 4.080.8750 | Cartridge body design frozen | 2003-Dec-01 | 2 Delay | 91 | 91 |
| | 4.085.8730 | Receiver Dewar #1 delivered to integration centre | 2004-Mar-15 | 2 Delay | 74 | 74 |
| | 4.085.8755 | Cartridge bodies for first receiver delivered | 2004-Apr-01 | 2 Delay | 91 92 | 91 153 |
| | 4.090.8765 | Freeze optics design | 2003-Sep-30 | 2 Delay | 92 | 153 |
| 48 | 4.095.8775 | Warm optics for receiver #1 delivered | 2004-Feb-01 | 2 Delay | 31 | 31 |
| 49 | 4.100.8845 | Freeze hardware design M&C circuit | 2004-Jan-01 | 2 Delay | 92 | 92 |
| 50 | 4.100.8860 | Deliver receiver control software to users | 2004-Mar-15 | 2 Delay | 74 61 | 74 61 |
| 51 52 | 4.100.8920 | Freeze the design of the FE chassis | 2003-Dec-01 | 2 Delay | 61 182 | 61 182 |
| 52 53 | 4.100.8922 4.105.8850 | Freeze FE Design Deliver the monitor and control module for front-end number one | 2004-Jul-01 2004-Mar-15 | 2 Delay 2 Delay | 162 14 | 14 |
| 54 | 4.105.8925 | Deliver the FE chassis for receiver #1 | 2004-Mar-01 | 2 Delay 2 Delay | 60 | 60 |
| | 4.105.8930 | Deliver the FE chassis for receiver #8 | 2004-Sep-01 | 2 Delay | 62 | 62 |
| | 4.175.8955 | Band 7 Cartridge #1 delivered | 2004-Oct-15 | 2 Delay | 14 | 14 |
| | 4.220.8975 | FE Test & Integration centre design ready | 2004-Jun-01 | 2 Delay | 244 | 244 |
| | 4.230.8980 | NA FE Test & Integration centre operational | 2005-Jun-01 | 2 Delay | 243 | 243 |
| 59 | 4.230.8985 | EU FE Test & Integration centre operational | 2005-Jun-01 | 2 Delay | 243 | 243 |
| 60 | 4.230.9000 | Deliver Receiver #1 to the ATF | 2005-Oct-01 | 2 Delay | 92 | 92 |
| | 4.230.9005 | Deliver receiver #2 to OSF/AOS | 2006-Jan-01 | 2 Delay | 90 | 90 |
| 62 | 4.240.9030 | FE Service & exchange vehicle #1 available | 2005-Oct-01 | 2 Delay | 183 | 183 |
| | | - 10 1 · | 2004 1 04 | O D-1 | | ~~ |
| 63 64 | 4.258.8890 4.258.8895 | Freeze LO design Deliver LO chain(s) for cartridge #1 | 2004-Jan-01 2004-Apr-01 | 2 Delay 2 Delay | 92 91 | 92 91 |

File: ALMA_amd_2003sep12b.xls Worksheet: ProgressSummary

| Т | 65 | 5.305.8030 | First Antenna based Back End Subsystem Ready for Installation at OSF | 2005-Nov-01 | 1 Delay | - | 124 |
|---|----|------------|--|----------------------------|--------------------|------|-----|
| ١ | 66 | 6.315.9215 | Pass Critical Design Review | 2003-Oct-31 | 2 Delay | 70 | 137 |
| ı | | | | | | | |
| ı | 67 | 6.320.9220 | Contract signed for Custom Correlator chips | 2003-Oct-31 | 2 Delay | 60 | 60 |
| ı | | | | | | | |
| ı | 68 | 6.320.9230 | Begin assembly of first quadrant | 2003-Oct-31 | 2 Delay | 60 | 60 |
| ı | 69 | 6.320.9235 | Begin board testing for first quadrant | 2004-May-01 | 2 Delay | 180 | 180 |
| ı | 70 | 6.320.9240 | Begin integrated testing for first quadrant | 2004-Jun-01 | 2 Delay | 61 | 61 |
| 1 | 71 | 6.320.9250 | First quadrant shipped to Chile | 2005-Dec-31 | 2 Delav | 153 | 153 |
| ı | 72 | 6.320.9255 | Begin Integration of second quadrant* | 2005-Oct-01 | 2 Delay | 267 | 267 |
| ı | 73 | 6.320.9265 | Begin integrated testing for second quadrant | 2006-Jan-01 | 2 Delay | 245 | 245 |
| 1 | 74 | 6.320.9275 | Second quadrant shipped to Chile | 2006-Dec-31 | 2 Delay | 358 | 358 |
| ı | 75 | 6.320.9280 | Begin Integration of third quadrant* | 2006-Oct-01 | 2 Delay | 267 | 267 |
| ı | 76 | 6.320.9290 | Begin integrated testing for third quadrant | 2007-Jan-01 | 2 Delay | 245 | 245 |
| ı | 77 | 6.320.9300 | Third quadrant shipped to Chile | 2007-Dec-31 | 2 Delay | 358 | 358 |
| ı | 78 | 6.320.9305 | Begin integration of fourth quadrant* | 2007-Oct-01 | 2 Delay | 267 | 267 |
| ı | 79 | 6.320.9315 | Begin integrated testing for fourth quadrant | 2008-Jan-01 | 2 Delay | 245 | 245 |
| ı | 80 | 6.320.9320 | Fourth quadrant shipped to Chile | 2008-Dec-31 | 2 Delay | 359 | 359 |
| 1 | 81 | 6.325.9355 | 2GC System Requirements Review | 2003-Nov-30 | 2 Delay | - | 194 |
| ı | 82 | 8.365.9602 | System Requirements Review (SRR) - System Requirements Finalized | 2003-N0V-30 2003-Oct-31 | 2 Delay | - 60 | 60 |
| ı | 83 | 8.365.9605 | ALMA System Design Review | 2003-001-31 2004-Mar-31 | 2 Delay 2 Delay | 121 | 121 |
| ı | | 8.370.9650 | • | | | 73 | |
| ı | 84 | | Prototype Integration & Verification Plan (Q4 2003 through Q4 2004) approved for | 2003-Oct-13 | 2 Delay | | 73 |
| ı | 85 | 8.370.9718 | NA Prototype Evaluation Report | 2004-Mar-12 | 2 Delay | 71 | 71 |
| ı | 86 | 8.370.9721 | EU Prototype Evaluation Report | 2004-May-31 | 2 Delay | 105 | 151 |
| ı | 87 | 9.380.9820 | Calibration strategy submitted | 2003-Oct-31 | 2 Delay | 31 | 31 |
| L | 88 | 9.380.9825 | Science aspects of operations plan complete | 2004-Jun-30 | 2 Delay | 182 | 182 |
| 1 | | | | | | | |

Note: "Relative Delay" reflects changes in the schedule since the selected reference schedule or since the Baseline was adopted, as indicated.

Deleted Milestones since 2003jun01b (Level 1 & 2 only):

| | | | Reference | |
|-------|------------|--|-------------|-------|
| Index | WBS | Milestone | Date I | Level |
| 1 | 3.035.8515 | Interim Antenna Technical Performance Report-AEC Antenna | 2003-Jul-10 | 2 |
| 2 | 3.045.8520 | Submit RFQ to Vertex/RSI | 2003-Jun-27 | 2 |
| 3 | 3.045.8522 | Receive firm fixed-price Quotation from Vertex/RSI | 2003-Sep-25 | 2 |
| 4 | 3.045.8536 | Receive Firm fixed-price Quotation from AEC | 2003-Oct-18 | 2 |
| 5 | 3.050.8564 | Earliest possible Single Source Contract for 31+1 North Am. Ant. | 2004-Jan-30 | 2 |
| 6 | 5.260.9104 | Contracts for BE Prototypes in Eur | 2003-Sep-30 | 2 |
| 7 | 6.320.9245 | Begin ordering parts for second quadrant | 2004-Oct-01 | 2 |
| 8 | 6.320.9270 | Begin ordering parts for third quadrant | 2005-Oct-01 | 2 |
| 9 | 6.320.9295 | Begin ordering parts for fourth quadrant | 2006-Oct-01 | 2 |
| | | | | |

New Milestones (Level 1 & 2 only):

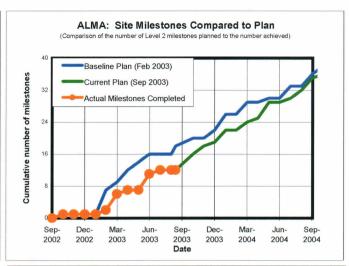
| Index WBS | Milestone | Scheduled Date | Level Status | Baseline Date |
|--------------|---|-------------------|--------------|------------------|
| 1 3.045.8524 | Prototype Antenna released to Contractor for Refurbishment / Transport to Chile | 2004-Aug-28 | 2 Delay | 2004-Jul-28 |
| 2 3.070.8571 | Transporter Contract signed | 2004-Mar-31 | 2 | 2004-Mar-31 |
| 3 5.295.9117 | End to End LO Demonstration | 2004-Dec-31 | 2 | 2004-Dec-31 |
| 4 5.295.9119 | Pre production LO Review | 2005-Mar-31 | 2 | 2005-Mar-31 |
| 5 6.320.9222 | Contract signed for Correlator PCB assembly | 2003-Oct-31 | 2 | 2003-Oct-31 |
| 6 7.340.9422 | Submit Computing Communications Study | 2004-Jan-01 | 2 | 2004-Jan-01 |

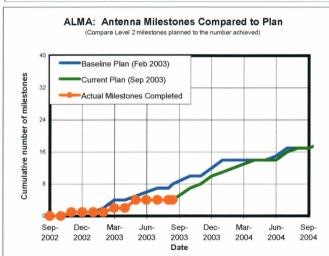
Milestones with a different Level in 2003sep12b as compared to 2003jun01b:

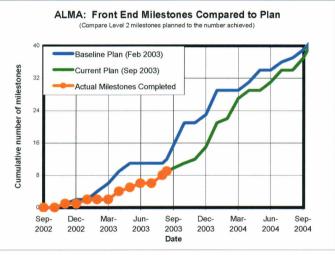
| | New Status | Baseline Date |
|-------------|---------------------|--|
| Date | Level Status | |
| 2004-Jan-31 | 3 Delay | 2004-Jan-10 |
| 2003-Oct-03 | 3 Delay | 2003-Jun-02 |
| 2000 001 00 | | |
| | Date 2004-Jan-31 | Date Level Status 2004-Jan-31 3 Delay |

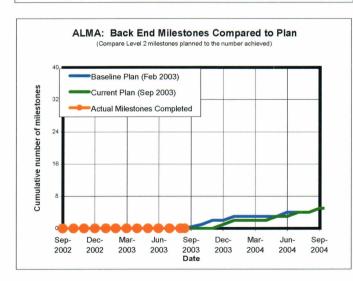
Milestone Progress, by IPT





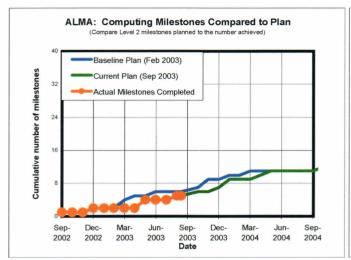


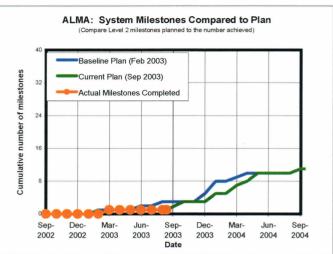


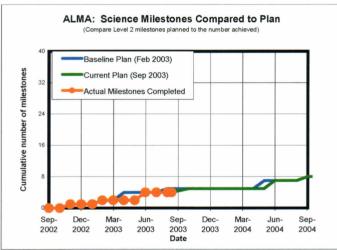




Milestone Progress, by IPT (continued)

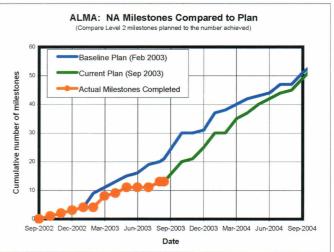




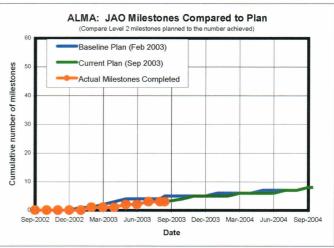


Milestone Progress, by Executive









ALMA Milestones: Statistical Summary (Version: 2003sep12b)

 Level 1 and 2 milestones scheduled for completion as of current date
 Level 1 and 2 milestones achieved as of current date Baseline:

Current Plan:

| 0 2011 | 0040 TDD | |
|--------|----------------|------------------|
| | 2012 TBD | Tota |
| 1 | 1 | 10 |
| 6 10 | | 306 |
| 2 | | 20 |
| | 1 3 10 2 | 1 1 3 10 2 |

| Milestone | Year -> | | | | | | | | | | | | |
|-----------|---------|------|------|------|------|------|------|------|------|------|------|-----|------|
| Level | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | TBD | Tota |
| 1 | | 2 | | | | | | | | | | | : |
| 2 | 8 | 34 | | | | | | | | | | | 42 |
| 3 | 3 | 93 | | | | | | | | | | | 96 |
| Totals | 11 | 129 | | | | | | | | | | | 1 |

| Milestone Level | Year -> 2002 | | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | TBD | Tota |
|--------------------|-----------------|---|------|------|------|------|------|------|------|------|------|-----|------|
| 1 | | | | | | | | | | | | | (|
| 2 | | 1 | | | | | | | | | | | 1 |
| 3 | | 5 | | | | | | | | | | | 5 |
| Totals | 3 | 6 | | | | | | | | | | | 6 |

| Month | Baseline Milestones (scheduled) | Current Plan Milestones (scheduled) | Milestones Accomplished | Average Delay (days) (** ⇒ planned) |
|--------------------|---------------------------------------|---|----------------------------|-------------------------------------|
| Jan-2003 & earlier | 12 | 10 | 10 | - |
| 2003-Feb | 12 | 4 | 4 | 6 |
| 2003-Mar | 9 | 6 | 6 | 39 |
| 2003-Apr | 13 | 4 | 4 | 30 |
| 2003-May | 6 | 6 | 6 | 55 |
| 2003-Jun | 5 | 7 | 7 | 56 |
| 2003-Jul | 4 | 2 | 2 | -22 |
| 2003-Aug | 3 | 4 | 4 | 103 |
| 2003-Sep | 11 | 7 | 1 | 139 |
| 2003-Oct | 11 | 14 | - | 79 ** |
| 2003-Nov | 3 | 6 | - | 22 ** |
| 2003-Dec | 9 | 9 | - | 118 ** |
| Total | 98 | 79 | 44 | |

| | | Number of | milestones (E | Binned by De | lay in days) | |
|------------------|-----|-----------|---------------|--------------|--------------|-------|
| | ≤ 7 | 8-30 | 31-60 | 61-90 | 91-120 | ≥ 121 |
| 2002 (Completed) | 9 | 0 | 0 | 0 | 0 | 0 |
| 2003 (Completed) | 9 | 6 | 10 | 4 | 2 | 4 |
| 2003 (Scheduled) | 21 | 0 | 5 | 4 | 7 | 17 |
| 2004 (Scheduled) | 38 | 3 | 3 | 6 | 5 | 15 |
| 2005 (Scheduled) | 38 | 0 | 0 | 0 | 2 | 9 |
| 2006 (Scheduled) | 31 | 0 | 0 | 1 | 0 | 3 |

| ilestone# | WBS# | ilestone Summary (Version: 2003sep12b) | Due Date | Level | Status | | _ | _ | | | | | | | | Т | | Dela |
|--------------------------|---|---|-------------|--|--|--------------|--|--|--|--|--|------|--|--|------|--|-------------|------|
| | WBG # | Milestone Hame | Due Date | Level | Otatus | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | Responsible | dav: |
| 3105 | 1.010.8105 | Designation of responsibility for Phase 2 development work elements in Europe | 2003-Sep-15 | 2 | Delay | | XX | | | | | | The same | | | | EU | |
| 8110 | 1.010.8110 | Designation of responsibility for Phase 2 production work elements in Europe | 2004-Jul-01 | 2 | | | | X | | | PER STATE OF THE PER ST | | | | | | EU | |
| 8120 | 1.010.8120 | Executives submit 2003 budget and financial projections to JAO | 2003-Feb-05 | 5 2 | Done | | X | - | | | - | | | 2000 | | | Both | |
| 8121 | 1.010.8121 | Executives submit 2002 financial report (actual expenditures and value earned) to JAO | 2003-Apr-28 | helmminnetphine-spin h | Done | 11,500 | XX | | | | Total Services | | | | | | Both | |
| 8122 | 1.010.8122 | Executives submit 2004 budget and financial projections to JAO | 2003-Sep-01 | CANADANA MARAKAMANAN | Late | 4 | X | | | | | | | | | | Both | |
| 8123 | 1.010.8123 | Executives submit 2003 financial report (actual expenditures and value earned) to JAO | 2004-Feb-28 | | | | | X | | | Security | | | | | | Both | |
| 8124 | 1.010.8124 | Executives submit 2005 budget and financial projections to JAO | 2004-Sep-01 | and worth the American price on which | | | | X | | | Commence | | | - Aller State of the State of t | | | Both | |
| 8410 | 1.010.8410 | Start Operations Budget | 2005-Jan-01 | | | | | | X | | X | | | odinate. | | - | Both | - |
| 8125 | 1.010.8125 | Executives submit 2004 financial report (actual expenditures and value earned) to JAO | 2005-Feb-28 | and the second residence in some times | | | 200 | Control of the Contro | X | e e e e e e e e e e e e e e e e e e e | a)-fellow | | | | | | Both | |
| 8126 | 1.010.8126 | Executives submit 2006 budget and financial projections to JAO | 2005-Sep-01 | nymeral entrepend investore | | | | and the second | X | The second | and the same | | | Design of the last | | | Both | |
| 8127 | 1.010.8127 | Executives submit 2005 financial report (actual expenditures and value earned) to JAO | 2006-Feb-28 | plantin complitte Norse | - | | - | | | X | Company of the Compan | | | | | anace. | Both | |
| 8128 | 1.010.8128 | Executives submit 2007 budget and financial projections to JAO | 2006-Sep-01 | | - | | | The same of the sa | | X | and a second | | | of the same | | | Both | |
| 8129 | 1.010.8129 | Executives submit 2006 financial report (actual expenditures and value earned) to JAO | 2007-Feb-28 | | | | - | | | | X | | | Service . | | Tanada Cara | Both | |
| 8130 | 1.010.8130 | Executives submit 2008 budget and financial projections to JAO | 2007-Sep-01 | | | | | | | | X | | | Control of the Contro | | *** | Both | |
| 8131 | 1.010.8131 | Executives submit 2007 financial report (actual expenditures and value earned) to JAO | 2008-Feb-28 | non-revenitor to remove and | | | | and the same of th | | | | X | | T-ADDRESS OF THE STREET | | 1 | Both | |
| 8132 | 1.010.8132 | Executives submit 2009 budget and financial projections to JAO | 2008-Sep-01 | | | | | | | | and the same of th | X | | The state of the s | | | Both | |
| 8133 | 1.010.8133 | Executives submit 2008 financial report (actual expenditures and value earned) to JAO | 2009-Feb-28 | | | | Salara Sa | | | | | | X | | | | Both | |
| 8134 | 1.010.8134 | Executives submit 2010 budget and financial projections to JAO | 2009-Sep-01 | Annual Articles (Philips - Mrs | | | | | | | | | X | STATE OF THE PROPERTY. | | - | Both | |
| 8135 | 1.010.8135 | Executives submit 2009 financial report (actual expenditures and value earned) to JAO | 2010-Feb-28 | repeating a victor in earliest | an acciding of colors of the color | | Continue | | | | Contra | | | X | | | Both | |
| 8136 | 1.010.8136 | Executives submit 2011 budget and financial projections to JAO | 2010-Sep-01 | | | | | - | | | | | | X | | David Control | Both | |
| 8137 | 1.010.8137 | Executives submit 2010 financial report (actual expenditures and value earned) to JAO | 2011-Feb-28 | | | | | | | | 200 | | | | X | | Both | |
| 8050 | 1.015.8050 | Completion of Construction Project | 2011-Dec-31 | | | | | | 2 Postson | | Shring | | | et establish | | | Both | |
| 3165 | 1.015.8165 | Site available for Work | 2003-Jul-25 | and the same of th | Done | | XX | | | | | | | | | NO. | JAO | |
| 3170 | 1.015.8170 | Submit 2003 budget and financial projections to ALMA Board | 2003-Feb-11 | Appropriate the second section in the second | Done | | X | Darwin. | | | | | | | | | JAO | |
| 8171 | 1.015.8171 | Submit 2002 financial report (actual expenditures and value earned) to ALMA Board | 2003-May-26 | | Done | | XX | Control | | | Service . | | | 2000 | | | JAO | |
| 8227 | 1.015.8227 | ALMA Groundbreaking | 2003-Nov-03 | instruments to be about the | | |) | 1 | | | 7 | | | 00000 | | - | JAO | |
| 8172 | 1.015.8172 | Submit 2004 budget and financial projections to ALMA Board | 2003-Sep-30 | | | | X | St. | | | | | | | | | JAO | |
| 8173 | 1.015.8173 | Submit 2003 financial report (actual expenditures and value earned) to ALMA Board | 2004-Mar-31 | | L | | | X | | | Seator) | | | | | The same of | JAO | |
| 8174 | 1.015.8174 | Submit 2005 budget and financial projections to ALMA Board | 2004-Sep-30 | | | | and the same of | X | | | | | | - Control | | - Andrew | JAO | |
| 8175 | 1.015.8175 | Submit 2004 financial report (actual expenditures and value earned) to ALMA Board | 2005-Mar-31 | makes desired the second | | | | | X | | | | | - | | - | JAO | |
| 8176 | 1.015.8176 | Submit 2006 budget and financial projections to ALMA Board | 2005-Sep-30 | | | | | don't de | X | | | | | | | - | JAO | |
| 8177 | 1.015.8177 | Submit 2005 financial report (actual expenditures and value earned) to ALMA Board | 2006-Mar-31 | althograms of the advantage of Advances | | | | | | X | | | | | | | JAO | |
| 8178 | 1.015.8178 | Submit 2007 budget and financial projections to ALMA Board | 2006-Sep-30 | net with plant the reader | -0.000 | | | | | X | | | | | | Name of the least | JAO | |
| 8179 | 1.015.8179 | Submit 2006 financial report (actual expenditures and value earned) to ALMA Board | 2007-Mar-31 | aliante vanda anno anti- | *** | 100 | The same of the sa | | | | X | | | and the same of | | | JAO | |
| 8180 | 1.015.8180 | Submit 2008 budget and financial projections to ALMA Board | 2007-Sep-30 | | | | | | and the same of th | | X | | | | | | JAO | |
| 8181 | 1.015.8181 | Submit 2007 financial report (actual expenditures and value earned) to ALMA Board | 2008-Mar-31 | | - | | - | | | | | X | | | | | JAO | |
| 8182 | 1.015.8182 | Submit 2009 budget and financial projections to ALMA Board | 2008-Sep-30 | y in him well the Parket and | | | | | | | | X | | | | and the same | JAO | |
| 8183 | 1.015.8183 | Submit 2008 financial report (actual expenditures and value earned) to ALMA Board | 2009-Mar-31 | performance of the second | | | | | | No. | 100 | | Χ | Sec. | | - | JAO | |
| 8184 | 1.015.8184 | Submit 2010 budget and financial projections to ALMA Board | 2009-Sep-30 | | | | THE PERSON | | | The same of the sa | | | X | Scott Control | | and a second | JAO | |
| 8185 | 1.015.8185 | Submit 2009 financial report (actual expenditures and value earned) to ALMA Board | 2010-Mar-31 | | ļ | | | NO. | - | Name of the least | | | The same of the sa | X | | No. | JAO | |
| 8186 | 1.015.8186 | Submit 2011 budget and financial projections to ALMA Board | 2010-Sep-30 | | | | Partialities | | The state of the s | No. | See | | | X | V | 1 | JAO | |
| 8187 8208 | 1.015.8187 2.025.8208 | Submit 2010 financial report (actual expenditures and value earned) to ALMA Board | 2011-Mar-31 | ni n | 6 | | | - Contract | The state of the s | Media | | | and the same of th | Scandin | ٨ | жилания | JAO | |
| 8208 8212 | 2.025.8208 | Final Approval of Architectural program for all AOS buildings | 2003-Mar-03 | | Done | | Č. | and the same of th | | and the same of th | 130 | | | | | Constitution of the Consti | NA Deth | |
| 8212 8213 | 2.025.8212 | Draft Joint Antenna Foundation Interface | 2003-Mar-06 | | Done | | N.V | and | | Name of the last | Condition | | | 1 | | Services | Both | |
| 8213 8216 | 2.025.8213 | Freeze Joint Antenna Foundation Interface | 2003-Jun-30 | to the Gebraham and the Sente A | Done | | XX | - | The Carrier of the Ca | B094/20138 | | | | | | Dividual | Both | |
| 8216 8220 | 2.025.8216 | Freeze Central Cluster Configuration | 2003-Mar-01 | rainballiprinse kraulituspinasieri | Done | | ^ | - | | And in column | - | | | - | | The same of the sa | NA NA | |
| 8222 | 2.025.8222 | Award Contract Design / Engineering for AOS Facilities NA AOS Foundations NA CDR | 2002-Oct-09 | | Done | , | V V | opposition of the same of the | of the state of | - Accordance | (Consultation of the consultation of the consu | | | - | | above: | NA NA | |
| 8224 | 2.025.8224 | AOS Foundations NA CDR AOS Foundations NA Central Cluster Construction Tender Docs Complete | 2003-Sep-30 | part of the burn of the strategy | Delay | | ^ | X | | No. | - | | | - | | and the same of th | NA NA | |
| 8226 | 2.025.8224 | AOS Foundations NA Central Cluster Construction Tender Docs Complete AOS Foundations NA Central Cluster Construction Contract Signed | 2004-May-30 | | Cholon | | ^ | ^ . | - Lance | - Contract | - | | | Total Control | | Transition of the last of the | | |
| 8010 | 2.025.8226 2.025.8010 | Begin initial Phase of Civil Work in Chile | 2004-Nov-30 | OWNERS WITHOUT THE REST | Done | | 1 |) | Tonor. | | No. | | | and the same of th | | TO STATE OF THE PARTY OF THE PA | NA Roth | |
| 8228 | 2.025.8228 | AOS Foundations NA Central Cluster Provisional Acceptance | 2003-Jul-26 | | Done | | | - | | | | | City City City City City City City City | - | | SHOWS | Both | |
| 8228 8230 | 2.025.8228 | AOS Foundations NA Central Cluster Provisional Acceptance AOS Foundations NA Remaining Construction / Tender Docs Complete | 2007-Jun-30 | Marin Company of the Company | ratiav | | | The second secon | ^ | | X | | | | | Service Servic | NA NA | |
| 3230 3232 | 2.025.8230 | | 2003-Nov-30 | title endorgrant analysis et entoret | | | , | | 1 | De la company de | | | | The Control of the Co | | National Property of the Parket | NA NA | |
| 8232 8234 | 2.025.8232 | AOS Foundations NA Remaining Construction Contract Signed | 2004-May-31 | | | | | ^ | × | ~ | > | | | - Company | | - | NA | |
| 8234 8236 | ehonivispeninos hárgin rehonivispeninos horalistica | AOS Foundations NA Remaining Provisional Acceptance | 2006-May-31 | | to the consensation of | | and the same of th | and the same of th | | X | X | | | | | assigna | - | |
| and experience done pro- | 2.025.8236 | AOS Foundations EU Design/Eng Contract Awarded | 2007-Jan-01 | mantella bracket | ļ | | - | Decom | | Desire Co. | ^ | | | and the same | | Contests | 1 - | |
| 8238 | 2.025.8238 | AOS Foundations EU CDR Complete | 2007-Apr-01 | | and the State of Stat | | The same of the sa | | Action in the second | arrange and a second | X | | | - | | | - | |
| 8240 | 2.025.8240 | AOS Foundations EU Construction / Tender Docs Complete | 2007-Jul-01 | 2 | | The state of | 1 | 1 | | 1 | X | | 1 | 1 | | 8 | | |

| Miloston - 4 | | lestone Summary (Version: 2003sep12b) | D D 1 | | 04.4 | Lege | nu: L | ever 1: | Lev | €1 Z: ⊼ | Level | 5:0 | Origina | l dates ir | gray) | | | |
|--------------|-------------|--|-------------|-----------------------------------|---|-----------|--|---------|--|--|--|--|---------------|--|-------|--|-------------|-----------------|
| Milestone # | WBS# | Milestone Name | Due Date | Leve | I Status | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | Responsible | Delay (days) |
| 8242 | 2.025.8242 | AOS Foundations EU Construction Contract Signed | 2008-Mar-01 | 2 | | 76.50 | | | alore and a second | | Carriera | X | | arance and a second | | | - | 0 |
| 8244 | 2.025.8244 | AOS Foundations EU Provisional Acceptance | 2011-Oct-01 | 2 | | | | | | OTDIO PER | | | Accidance | |) | | - | 0 |
| 8250 | 2.025.8250 | AOS Buildings NA Foundations/Envelope CDR Complete | 2003-Oct-31 | | Delay | | XX | | | | Security | | | Z. Grants | | | NA | 213 |
| 8252 | 2.025.8252 | AOS Buildings NA Foundations/Envelope Construction / Tender Docs Complete | 2004-Mar-15 | 2 | Delay | | X | X | Constant of the Constant of th | | Company of the Compan | | | de constant | | | NA | 289 |
| 8254 | 2.025.8254 | AOS Buildings NA Foundations/Envelope Construction Contract Signed | 2004-Sep-15 | | Delay | | X | X | | | | | | | | | NA | 259 |
| 8258 | 2.025.8258 | AOS Buildings NA Foundations/Envelope Provisional Acceptance | 2005-May-15 | 2 | Delay | | | X | X | | - | | On the last | | | | NA | 257 |
| 8260 | 2.025.8260 | AOS Buildings Finish & Installations NA CDR Complete | 2004-Apr-30 | | Delay | | X | X | et a second | Mileto | States | | - | - | | | NA | 243 |
| 8262 | 2.025.8262 | AOS Buildings Finish & Installations NA Construction / Tender Docs Complete | 2004-Aug-31 | 2 | Delay | | X | X | | | discours. | | | - | | | NA | 275 |
| 8264 | 2.025.8264 | AOS Buildings Finish & Installations NA Construction Contract Signed | 2005-Feb-28 | 2 | Delay | | | X | X | The state of the s | and the same of | | | de la constante de la constant | | | NA | 242 |
| 8266 | 2.025.8266 | AOS Buildings Finish & Installations NA Provisional Acceptance | 2005-Dec-31 | 2 | Delay | | | | XX | | | and the same of th | | Total Control | | | - | 184 |
| 8025 | 2.025.8025 | Initial Phase of Civil Work in Chile Complete | 2005-Jun-30 | | | TAX TO SE | | | 1 | | | | | | | | Both | 0 |
| 20701 | 2.025.20701 | AOS Interconnect Roads & Trenches NA Provisional Acceptance | 2007-Jun-30 | SCARGO CHARLESTON OF | | | | | | Trong and | X | | | - | | | - | 0 |
| 8284 | 2.025.8284 | AOS Interconnect Roads & Trenches EU Provisional Acceptance | 2011-Oct-01 | | | | | | | | 0 | | | and a |) | | - | 0 |
| 8286 | 2.025.8286 | Complete AOS Construction | 2011-Oct-01 | 2 | | | | | | | - | | | |) | | - | 0 |
| 8290 | 2.025.8290 | Construction Road Opening EU Construction / Tender Docs Complete | 2003-Feb-26 | | Done | | X | | | | | - | | Cupies | | | EU | 11 |
| 8292 | 2.025.8292 | Construction Road Opening EU Construction Contract Signed | 2003-Jun-25 | 2 | Done | | X | | decina | and the same | and the | | | chotrac | | | EU | 85 |
| 8294 | 2.025.8294 | Construction Road Opening EU Provisional Acceptance | 2003-Nov-30 | 2 | Delay | | XX | | | | | | - | CENTRAL | | | EU | 61 |
| 8300 | 2.025.8300 | Access Road EU Design/Eng Contract Awarded | 2003-Mar-17 | 2 | Done | | X | | | audicion | | | | | | | EU | 32 |
| 8302 | 2.025.8302 | Access Road to OSF EU CDR Complete | 2003-Jun-09 | 2 | Done | | XX | | | PODE S | 2000 | | | Section 1 | | | EU | 70 |
| 8304 | 2.025.8304 | Access Road OSF to AOS EU CDR Complete | 2003-Jun-09 | 2 | Done | | X | | Olympia. | | Sharens . | | | Same | | | EU | 55 |
| 8306 | 2.025.8306 | Access Road EU Construction / Tender Docs Complete | 2003-Oct-15 | 2 | Delay | 4.37 | XX | | | | - | | - | | | | EU | 91 |
| 8308 | 2.025.8308 | Access Road EU Construction Contract Signed | 2004-May-30 | 2 | | | | X | | National Property | Security | | | 2000 | | | EU | 0 |
| 8310 | 2.025.8310 | Access Road OSF-AOS ready to accommodate transporter | 2005-Jun-30 | 2 | | | | | X | | | | | apasa a | | | _ | 0 |
| 8312 | 2.025.8312 | Access Road EU Provisional Acceptance | 2008-Dec-31 | 2 | | | | | | - | |) | 4 | | | | _ | 0 |
| 8334 | 2.025.8334 | Contractors Camp Initial Occupancy | 2004-Jan-01 | 2 | Delay | | X | X | | | | | | | | | EU | 63 |
| 8340 | 2.025.8340 | OSF Facilities Phase 1 (Tech area) EU Design/Eng Contract Awarded | 2003-Oct-01 | 2 | Delay | | XX | | | 100-4cm | Ottoma | | | | | | EU | 122 |
| 8342 | 2.025.8342 | OSF Facilities Phase 1 (Tech area) EU CDR Complete | 2004-Jan-15 | 2 | Delay | | X | X | | No. | - | | | | | | EU | 122 |
| 8344 | 2.025.8344 | OSF Facilities Phase 1 (Tech area) EU Construction / Tender Docs Complete | 2004-May-01 | 2 | Delay | | X | X | | On Charles | and the same of th | | | - | | | EU | 122 |
| 8346 | 2.025.8346 | OSF Facilities Phase 1 (Tech area) EU Construction Contract Signed | 2004-Oct-01 | | Delay | | | (X) | | and the same of th | 000 | | | | | | EU | 183 |
| 8348 | 2.025.8348 | OSF Facilities Phase 1 (Tech area) EU Provisional Acceptance | 2006-Feb-01 | 2 | Delay | | The second | | X | X | | and the same of th | | | | Market | _ | 185 |
| 8350 | 2.025.8350 | OSF Facilities Phase 2 (Res. / Visitor) EU Design/Eng Contract Awarded | 2008-Oct-01 | 2 | | 10.10 | | | The same of the sa | 0 | |) | | | | | - | 0 |
| 8352 | 2.025.8352 | OSF Facilities Phase 2 (Res. / Visitor) EU CDR Complete | 2009-Mar-31 | | | 11270 | | | Monte | - | - | | X | | | | - | 0 |
| 8354 | 2.025.8354 | OSF Facilities Phase 2 (Res. / Visitor) EU Construction / Tender Docs Complete | 2009-Jul-01 | 2 | | | 100 | | and the same of th | ELEVANDA. | - | | X | | | | _ | 0 |
| 8356 | 2.025.8356 | OSF Facilities Phase 2 (Res. / Visitor) EU Construction Contract Signed | 2010-Jan-01 | 2 | | | | | | NO PER | | | | X | | | - | 0 |
| 8358 | 2.025.8358 | OSF Facilities Phase 2 (Res. / Visitor) EU Provisional Acceptance | 2011-Oct-01 | 2 | | | | | | 44/2003 | CT-CO-CO-CT-CT-CT-CT-CT-CT-CT-CT-CT-CT-CT-CT-CT- | | | - |) | | - | 0 |
| 8360 | 2.025.8360 | Freeze Fiber Optics and Electrical Specifications | 2003-Dec-31 | | Delay | | XX | | San | | - | | | | | | Both | 274 |
| 8362 | 2.025.8362 | Fiber Optic Cables and Electrical Cables in Chile, N.A. | 2004-Sep-30 | 2 | Delay | | Consultation of the Consul | X | | and | | The same of the sa | - Calculation | | | | NA | 15 |
| 8364 | 2.025.8364 | OSF-AOS Fiber Optics Link Installed | 2006-Dec-31 | 2 | | | | | | | x | | | THE STATE OF THE S | | TO THE PERSON NAMED IN | | 0 |
| 8366 | 2.025.8366 | Fiber Optic Cables and Electrical Cables in Chile, Eur. | 2008-Sep-01 | | | 1000 | | | | No. | | X | | - | | | _ | 0 |
| 8370 | 2.025.8370 | Power Feasibility Study Completed | 2003-Apr-07 | | Done | | XX | | Water Company | | | | | | | | EU | 7 |
| 8372 | 2.025.8372 | ALMA Project Power Supply Plan Approved | 2004-Jan-31 | | Delay | | X | X | | 200 | Section 2 | | - | de la constanta | | | Both | 153 |
| 8374 | 2.025.8374 | ALMA Permanent Power Supply Tender Docs Complete | 2004-Mar-31 | | Delay | | X | X | DOM: | Andrew Company | Clarific Co. | | - | | | | Both | 91 |
| 8376 | 2.025.8376 | ALMA Permanent Power Supply Contract Signed | 2004-Aug-31 | | Delay | | | XX | | Distance | | | | | | | Both | 92 |
| 8378 | 2.025.8378 | Provisional Acceptance Power Supply Contract Phase 1 | 2005-Sep-30 | | Delay | | | | 1 XX | Otenical | | | Lances | | | | Both | 92 |
| 8380 | 2.025.8380 | Provisional Acceptance Power Supply Contract Last Phase | 2006-Dec-31 | | Name and a Confession of the Confession | | | | 1 | | X | | | | | | | 0 |
| 8390 | 2.025.8390 | Board Decision Location/Size Santiago JAO Office | 2004-Jul-01 | weathers be the reduced | - | | | X | - Cheese | | | | | | | | JAO | 0 |
| 8391 | 2.025.8391 | Architectural Design Contract awarded Santiago JAO Office | 2004-Sep-01 | | | | | X | | geeddada. | - | | | 100 | | | EU | 0 |
| 8392 | 2.025.8392 | CDR Santiago JAO Office | 2004-Nov-01 | | | | |) | 6 | SEP-O-TEN | | 8000 | | | | | EU | 0 |
| 8393 | 2.025.8393 | Construction Tender Docs Complete Santiago JAO Office | 2004-Dec-01 | | | | |) | | | - | | | - | | NA STATE OF THE ST | EU | 0 |
| 8394 | 2.025.8394 | Construction Contract signed Santiago JAO Office | 2005-Jan-01 | without the best and the best had | | | | | X | de constant | | | Districts | No. | | | EU | 0 |
| 8395 | 2.025.8395 | Provisional Acceptance Santiago JAO Office | 2006-Jan-01 | | | | | | Marcon | X | -0.00 | | | National Section 1 | | Distrement | EU | 0 |
| 8502 | 3.035.8502 | Shared Access VertexRSI Antenna | 2002-Nov-15 | | Done | X | | | | The same of the sa | | | - | | | | NA | 0 |
| 8503 | 3.035.8503 | Deliver Foundation Design requirements | 2003-May-02 | | Done | | XX | | | approximate the same of the sa | | | | - | | | Both | 76 |
| 8505 | 3.035.8505 | Provisional Acceptance of VertexRSI Antenna | 2003-Mar-20 | | Done | | X | | - | | Taranta and the same of the sa | | - | Contract of the Contract of th | | | NA | 59 |
| 8510 | 3.035.8510 | Complete Technical Performance Report-VertexRSI Antenna | 2003-Dec-10 | | Delay | | XX | | | December 1 | | | | | | - | NA NA | 265 |
| 8530 | 3.035.8530 | Shared Access AEC Antenna (Preliminary Acceptance) | 2003-Oct-10 | | Delay | | XX | | | - | | | Personal | | | | EU | 135 |
| 8540 | 3.035.8540 | Provisional Acceptance of AEC Antenna | 2003-Nov-21 | ny ny Karingarita ay Kalannan | Delay | | XX | | | result of the second | - | | | and the same of th | | | EU | 120 |
| | 3.035.8545 | Complete Technical Performance Report-AEC Antenna | 2004-Jan-21 | | Delay | | | | | - | | - | | 200 | | 000 | EU | 120 |

| filestone # | WBS# | Milestone Name | Due Date | Level | Status | 3 | | | | | | | | | | | | Delay |
|--------------|--------------------------|---|--|--|--|------|--|--|------|--|--|--|------|--|------|--|-------------|-------|
| 0.00 | | | | | | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | Responsible | davs |
| 8500 | 3.045.8500 | RFQ for VertexRSI Antenna Delivered to Project Office | 2003-May-20 | | Done | | XX | | | | | estorios. | | ST. CO. | | Constant | NA | 11 |
| 8524 | 3.045.8524 | Prototype Antenna released to Contractor for Refurbishment / Transport to Chile | 2004-Aug-28 | Advantadominados kaita | Delay | | | X | | To the same of the | | entinositi. | | apacta . | | | Both | |
| 8525 | 3.045.8525 | CFT/RFQ Bid Package Submitted to Project Office (AEC/VertexRSI) | 2003-Sep-30 | | Delay | | XX | | | | Service Servic | de la constitución de la constit | | | | and and a | Both | 1: |
| 8535 | 3.045.8535 | Issue CFT/RFQ for Production Antenna Design(s) | 2003-Oct-31 | | Delay | | 1 × ? | Section 1 | | | | Shakes | | No. | | Contract of the Contract of th | Both | 1 |
| 8550 | 3.045.8550 | Closing Date for Production Antenna Bids (Competitive Tender) | 2004-Feb-28 | and a deviate and private the second | Delay | |) × | X | | | | Michelys | | | | (Classes) | Both | 1: |
| 8560 | 3.045.8560 | Bid Evaluations Due to Project Office | 2004-Apr-30 | white-orang-vertical- | Delay | | | XX | | | Choracter Control | 00000 | | | | No. | Both | ! |
| 8565 | 3.050.8565 | Sign Contract for 31+1 North Am. Production Antennas | 2004-Jul-28 | Marine the property of the colored | Delay | | | XX | | | CONTRACTOR OF THE PERSON AND THE PER | and the second | | Distribution | | TOWN DO | NA | |
| 8575 8585 | 3.050.8575 | Sign Contract for 32-Euro Production Antennas | 2004-Jul-28 | Secretary Court | Delay | | - Company | XX | | | | Disposite Control | | | | | EU | |
| 8035 | 3.050.8585 3.050.8035 | First Antenna Arrives at OSF (Retrofitted prototype TBC) First Production Antenna available in Chile at OSF | 2005-Oct-31 | electric planes objekte w | | | supplies | over the same of t | X | | | | | Zerosa Zerosa | | Transparent and the same and th | 5.0 | |
| 8600 | 3.060.8600 | 8th Antennas Preliminary Accepted at OSF | 2005-Dec-31 | | Care restrict states | | | Direction of the Control of the Cont | 1 | - | | release 123 | | | | District Control | Both | |
| 8605 | 3.060.8605 | | 2007-Feb-28 | mary market work higher than | | | | | | | X | Section . | | | | | - | |
| 8610 | 3.060.8610 | 20th Antennas Preliminary Accepted at OSF 30th Antennas Preliminary Accepted at OSF | 2008-Jun-12 | denoting which which | | | | | 1112 | | G-GIZ-WED | X | v | ST. ST. | | | - | |
| 8615 | 3.060.8615 | 50th Antennas Preliminary Accepted at OSF | 2009-Jun-12 | | | | | | | | Constant of the Constant of th | Nettrade. | Х | - | | - | · - | |
| 8620 | 3.060.8620 | All Antennas Preliminary Accepted at OSF | 2010-May-31 | | | | NACON . | | | | - | | | X | | CAST COLOR | - | |
| 8625 | 3.060.8625 | All Antennas Provisionally Accepted in Chile at AOS | 2011-Jun-30 2011-Dec-16 | side-ind-environmentally | | | and the same of th | distron | | | orthwo. | To the same of | | Dispose in the last of the las | ^ | The space | Both | |
| 8555 | 3.065.8555 | Nutator Critical Design Review Completed | Charly in the sixty of the will and the things of the part of the sales and | Mahamitty skyryf (ich velisio) | Delay | | | - | | The state of the s | The same of the sa | Para Carlo | | - Inches | , | MICHAEL | | 3 |
| 8590 | 3.065.8590 | All Nutators Accepted at OSF | 2004-Oct-28 2006-Apr-15 | | ClersiA | | / | A A | | X | 2000 | Separate Sep | | - | | 200000 | NA NA | - 3 |
| 8569 | 3.070.8569 | Transporter Critical Design Review Complete | 2000-Apr-13 | | Challery. | | | and a second | | ^ | - | at a second | | di Zan | | distance | | |
| 8571 | 3.070.8571 | Transporter Contract besign Keview Complete Transporter Contract signed | en a portar de la constantación de constantación de la propertica de la propertica de la constantación de la c | | Delay | | ^ ' | ~ | | | - | Same of the last o | | | | STOWN STORY | EU | 2 |
| 8580 | 3.070.8580 | First Transporter Accepted at OSF | 2004-Mar-31 2005-Sep-30 | | | | | ^ | | DA COLOR | | | | | | - | - | |
| 8595 | 3.070.8595 | Second Transporter Accepted at OSF | 2005-Sep-30 | introduce this plant who are | en Laborated California (Stagonica) | | apation . | STORY STORY | ^ | - | | paction of the control of the contro | | | | of the same of the | 1 | |
| 8700 | 4.075.8700 | Initial set of FE specs and interface-control documents discussed | 2003-Apr-01 | | Done | | X | | | ^ | and the same | day. | | Sec. | | See . | Both | |
| 8705 | 4.075.8705 | FE specifications and requirements plus ICD's submitted for approval | 2003-Apr-01 | imperhant interactivation | de general interaction or an | 100 | 1 | - | | | 1 | | | | | The same of | | 1 |
| 8990 | 4.075.8990 | Front end sub-system Delta PDR | 2003-Sep-01 2003-Dec-01 | WATER TO WATER TO STATE OF | Done | | XX | | | age of the same | | | | | | | Both | 1 |
| 8995 | 4.075.8995 | All FE Contracts / Agreements in place | 2003-Dec-01 | and the second second | Deley | | 1 | | | | The state of the s | | | | | Toward Inches | Both | 2 |
| 9020 | 4.075.9020 | RECEIVER CDR | 2006-May-01 | Agreement (from the principal princi | racida | | 1 ^ ' | | | XX | | cholony | | | | One of the last | Both | -1 |
| 9023 | 4.075.9023 | FE Production authorized | 2006-May-01 | while to make make | · · | | | enditro | | X | | Company | | | | To a constant | | |
| 8720 | 4.080.8720 | Freeze Dewar design | 2003-May-01 | | Done | | V | | | ^ | The second | | | | | CO. | EU | |
| 8740 | 4.080.8740 | Prototype cartridge bodies (plus dummies) delivered | 2003-Jan-01 | and the state of t | Done | | V ^ | | | | | | | | 1.5 | Dispersion of the last of the | EU | |
| 8750 | 4.080.8750 | Cartridge body design frozen | 2003-Dec-01 | School Strate Street and Street | Delay | | l' v | | | | | No. | | - | | | EU | |
| 8730 | 4.085.8730 | Receiver Dewar #1 delivered to integration centre | 2003-Dec-01 | | Delay | | 1 | - | | | Connection | | | | | | EU | |
| 8735 | 4.085.8735 | Receiver Dewar #8 delivered to integration centre | 2005-Jul-01 | eraning distinguished in propie | LAGICIY | | | ^ | х | | | Marie Control | | | | Sportson S | LO | |
| 8755 | 4.085.8755 | Cartridge bodies for first receiver delivered | 2004-Apr-01 | market or the transfer of the control of | Delay | | | ×x | ^ | | | 1 | | | | | EU | |
| 8760 | 4.085.8760 | Cartridge bodies for eighth receiver delivered | 2004-Jul-01 | | a more constant of | | | Y | | | SSECONDE | | | | | | EU | |
| 8765 | 4.090.8765 | Freeze optics design | 2003-Sep-30 | | Delay | | XX | 1 ^ | | | | Open Control | | | | 20100000 | EU | 1 |
| 8770 | 4.090.8770 | Freeze windows/IR filters design | 2003-Jun-17 | hamedownouther | Done | | X | District Co. | | | | | | - | | of equal | EU | |
| 8775 | 4.095.8775 | Warm optics for receiver #1 delivered | 2004-Feb-01 | erana de la constitución de | Delay | | - | x | | December 1 | September 1 | - | | and the same of th | | - | EU | |
| 8780 | 4.095.8780 | Windows/IR filters for receiver #1 delivered | 2004-Jan-01 | | - | | | X | | | | chicke | | applica. | | discount of the last | EU | |
| 8785 | 4.095.8785 | Warm optics for receiver #8 delivered | 2005-Jul-01 | | 1 | | ON THE REAL PROPERTY. | | х | ODE STATE OF THE PERSON OF THE | | Comments of the Comments of th | | | | | | |
| 8790 | 4.095.8790 | Windows/IR filters for receiver #8 delivered | 2005-Jul-01 | | ************ | | | To a contract of the contract | X | | and the same of | | | | | | _ | |
| 8810 | 4.100.8810 | Deliver lab-prototype DC bias circuits | 2003-Apr-24 | Ochandra Augusta manda | Done | | XX | | | No. | No. | New York | | | | - | NA | |
| 8820 | 4.100.8820 | Freeze the design of the DC support electronics | 2003-Oct-01 | | | |) | | | The state of the s | | NUMBER OF THE PERSON NAMED IN | - | - Company | | College Colleg | NA | |
| 8835 | 4.100.8835 | Deliver lab prototype M/C circuit | 2003-May-22 | | Done | | X | Total Control | - | TO TO THE TOTAL PROPERTY. | os opposite a construction of the construction | | | and a second | | The same of | NA NA | |
| 8845 | 4.100.8845 | Freeze hardware design M&C circuit | 2004-Jan-01 | | Delay | | 1 | X | | Espoluta | No. | | | Second | | - | NA NA | |
| 8856 | 4.105.8856 | Deliver the final monitor and control circuitry to each of the cartridge builders | 2004-Mar-01 | | agonto-tonibustos | | The second | X | | Tona Carlo | - | 1 | | (Statistics) | | 0.000 | NA | |
| 8860 | 4.100.8860 | Deliver receiver control software to users | 2004-Mar-15 | | Delay | | | X | | Mary Mary | No. | ettorette | | - | | and the second | NA | |
| 8865 | 4.100.8865 | Deliver FE software req. to computing IPT | 2004-Jan-01 | Nan-mountaine variables | | | | X | | No. | Name of the last | | | District of the last of the la | | | NA | |
| 8905 | 4.100.8905 | Freeze the design of the IF switch/processor | 2004-Jan-01 | Mills with the straight and wall | and the state of t | | | X | | | | Ex-0000 | | | | 100000 | NA | |
| 8920 | 4.100.8920 | Freeze the design of the FE chassis | 2003-Dec-01 | delibert contract replication | Delay | |) | The state of the s | | and | - | | | | | | NA | |
| 8922 | 4.100.8922 | Freeze FE Design | 2004-Jul-01 | Abericanol American | Delay | | | XX | | The same of the sa | State | Sales Sa | | | | - | Both | 1 |
| 8825 | 4.105.8825 | Deliver DC bias electronics for cartridge #1 | 2004-Jan-01 | and the second district and the second | 1 | | | X | | | | Table of the last | | | | person | NA | |
| 8830 | 4.105.8830 | Deliver DC bias electronics for cartridge #8 | 2004-Jul-01 | | Entrate of the State of State of | | - | X | | and a second | - | newspectual programme and prog | | The state of | | The second | NA | |
| 8850 | 4.105.8850 | Deliver the monitor and control module for front-end number one | 2004-Mar-15 | de endured a relative de la compansión d | Oelay | | | X | | The same of the sa | and the same of th | - | | - | | 0 | NA | |
| 8855 | 4.105.8855 | Deliver the monitor and control module for front-end number eight | 2004-Sep-01 | Application of the delegation of | - | | | X | | No. | The same of | Control of the Contro | | CECUTATION | | Section 1 | NA | |
| 8910 | 4.105.8910 | Deliver the IF switch/processor for the first front-end | 2004-Oct-01 | | -troplesamine relation | | | X | | and a section | - Constant | - | | | | Tour Tour | NA | |
| 8915 | 4.105.8915 | Deliver the IF switch/processor for the eighth front-end | 2005-Jul-01 | | | | 450000 | | X | | Stateship | | | | | (Contrar) | | |
| 8925 | 4.105.8925 | Deliver the FE chassis for receiver #1 | 2004-Mar-01 | Wytermorphisty Stocked and | Delay | | | Y | | control | | | | | | - | NA | |

| | | one Summary (Version: 2003sep12b) | | · | | | | _evel 1: | 1 Leve | el 2:X | Level 3 | 3: 0 | Origina | dates | in gray) | | | |
|---|--|---|----------------------------|--|----------------------------|-------|----------|--|--|--|--|--|--|--|--|--|-------------|----------------|
| estone # | WBS# | Milestone Name | Due Date | Leve | I Status | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | Responsible | Delay (days |
| 3930 | 4.105.8930 | Deliver the FE chassis for receiver #8 | 2004-Sep-01 | 1 2 | Delay | 70.0 | | X | | | | | | | | | NA | IWAYS |
| 3935 | 4.145.8935 | Band 3 Cartridge #1 delivered | 2004-Oct-01 | 12 | | | |) | | | | | | | and a | | NA | |
| 3940 | 4.145.8940 | Band 3 Cartridge #8 delivered | 2006-Jan-01 | 12 | | | | Sur Control | | X | | | | | 1 | | - | |
| 3945 | 4.165.8945 | Band 6 Cartridge #1 delivered | 2004-Oct-01 | 1 2 | | | |) | (quya | | | | | and the same of | | | NA | |
| 3950 | 4.165.8950 | Band 6 Cartridge #8 delivered | 2006-Jan-01 | 1 2 | | | 1 | | | X | | | | | 1 | | - | |
| 3955 | 4.175.8955 | Band 7 Cartridge #1 delivered | 2004-Oct-15 | 5 2 | Delay | | |) | | | | | Tames (Garage | | | The same of the sa | EU | |
| 3960 | 4.175.8960 | Band 7 Cartridge #8 delivered | 2006-Jan-01 | 1 2 | | | - | | Acceptance | X | | | | | | | - | |
| 3965 | 4.195.8965 | Band 9 Cartridge #1 delivered | 2004-Oct-01 | 1 2 | | | - |) | d | | | | | | - | -Case | EU | |
| 3970 | 4.195.8970 | Band 9 Cartridge #8 delivered | 2006-Jan-01 | 1 2 | | | | Model | | Χ | | | | | | | - | |
| 3795 | 4.210.8795 | Delivery of 2 WVR development prototypes | 2004-Sep-01 | 1 2 | | | - | X | Service . | | | | | | | | EU | |
| 8800 | 4.215.8800 | Deliver WVR #1 to OSF | 2006-Jan-01 | 1 2 | | | | | | X | | | | | | 0.00 | _ | |
| 3805 | 4.215.8805 | Deliver WVR #8 to OSF | 2006-Dec-01 | 1 2 | | | | - Contract | Telegraph (| X | | | | | | | - | |
| 3975 | 4.220.8975 | FE Test & Integration centre design ready | 2004-Jun-01 | 1 2 | Delay | |) | X | phago | | 0000 | | pagada | | | | NA | 2 |
| 3040 | 4.230.8040 | Initial Front End Subsystem available at OSF | 2005-Dec-31 | rabbin-voleta ko-up k-reh v | | | | | 1 | | | | | | | Dwista | Both | |
| 3980 | 4.230.8980 | NA FE Test & Integration centre operational | 2005-Jun-01 | | Delay | | |) | X | | | | | | - | | NA | 2 |
| 3985 | 4.230.8985 | EU FE Test & Integration centre operational | 2005-Jun-01 | | Delay | | |) | X | | | | and the same of th | | | 200000 | EU | 2 |
| 000 | 4.230.9000 | Deliver Receiver #1 to the ATF | 2005-Oct-01 | off the National Artist Televisia | Delay | | | - | XX | | | | Control of the Contro | | | - | | |
| 005 | 4.230.9005 | Deliver receiver #2 to OSF/AOS | 2006-Jan-01 | al-ring-loop-loop-promotive | Delay | | | Posterior P. | X | X | | | No. | | - | No. | | |
| 010 | 4.230.9010 | Deliver receiver #7 to OSF/AOS | 2006-Mar-15 | | 1 | | | 9 | - | Ŷ | | | Caperosa | | - | CON-SOCI | 1 | |
| 015 | 4.230.9015 | Deliver receiver #8 to OSF/AOS | 2006-May-01 | | | | | | | Y | | | | | | | | |
| 025 | 4.240.9025 | Issue RFP for FE Service & exchange vehicle | 2004-Jun-01 | notion between the | *** | | | X | | ^ | | | | | - | 125000 | Both | |
| 030 | 4.240.9030 | FE Service & exchange vehicle #1 available | 2005-Oct-01 | | Delay | | | 1 ^ | 1 v v | | | | The same of the sa | | | | Both | |
| 870 | 4.258.8870 | LO review | 2003-Oct-01 | more authorization and | man subdom-veticions | | | | ^ ^ | | | | - | | | | D-th | |
| 880 | war far i mengh wai in ing phope i mengh wai in ing | | | | Done | | 1 | | | | | | | | | and and | Both | |
| 890 | 4.258.8880 4.258.8890 | Deliver lab prototype LO chain to each cartridge man. Freeze LO design | 2003-Aug-22 2004-Jan-01 | | Done | | 1 ^ | | Open Control | | | | | | | | NA | |
| 895 | and the second of the second or the second of the second or the second o | | | | Delay | | 1 | | de la constantina | | | | | Section 1 | | - | NA | |
| 3900 | 4.258.8895 | Deliver LO chain(s) for cartridge #1 | 2004-Apr-01 | | Delay | | 100 | ^^ | | | | | | | | Design Control | NA | |
| printed by the best of the second printed | 4.258.8900 | Deliver LO chain(s) for cartridge #8 | 2005-Jan-01 | | and representations of the | | | | ^ | | | | | | - | No. | · | |
| 9100 | 5.260.9100 | Deliver BE modules for system integration | 2004-Jan-01 | | | | | × | restriction. | | | | and a second | | | Table 1 | Both | |
| 9106 | 5.260.9106 | Deliver Back End Production Plan | 2004-Sep-01 | | | | | × | | | TO THE REAL PROPERTY. | | O COLOR | | | - | Both | |
| 120 | 5.260.9120 | All BE production contracts placed | 2005-Jan-01 | | | | 1 | | X | | | | | | | and a | | |
| 9105 | 5.262.9105 | Install BE hardware on two ALMA prototype antennas at the ATF | 2004-May-01 | | TO -404 TO B 144TO | | 100 | X | | | | | | - | 1 | and | Both | |
| 9110 | 5.262.9110 | Complete BE Critical Design Review | 2004-Jul-01 | de miner de la construcción de l | | | | X | ALL STATES | | | | | AMPRICA | | eco-co- | Both | |
| 9115 | 5.295.9115 | LO Phase Correction Demonstration | 2003-Dec-31 | | | |) | 9 | and | | | | THE PERSON | | O COLOR | | NA | |
| 9117 | 5.295.9117 | End to End LO Demonstration | 2004-Dec-31 | | mp physical recountry mp | | | 1 | Carpon . | | | | Manage | - | | | NA | |
| 119 | 5.295.9119 | Pre production LO Review | 2005-Mar-31 | | | | | | X | | 0 | | | | | - | NA | |
| 020 | 5.305.8020 | Central Back End System Ready to Install at Array Site | 2005-Mar-31 | newstanian uncome | NEW CONTRACTOR | | 130 | | 1 | | | | | | | | Both | |
| 030 | 5.305.8030 | First Antenna based Back End Subsystem Ready for Installation at OSF | 2005-Nov-01 | - | Delay | | | | 1 1 | | | | | | Septime. | | Both | |
| 122 | 5.305.9122 | Deliver Back End Assemby, Test, & Verification Plan | 2004-Nov-30 | | | | |) | | OR THE REAL PROPERTY. | 1000 | | - | and | | | Both | |
| 125 | 5.305.9125 | All ALMA assembly, test and verification equipment in place | 2005-May-01 | 1 2 | | | | | X | | | | | | | Division of the Control | | |
| 130 | 5.305.9130 | Deliver BE antenna hardware for first three antennas | 2005-Nov-01 | | | The o | | - | X | | | | - | | and the second | | - | |
| 135 | 5.305.9135 | Deliver BE central electronics hardware for first three antennas | 2005-Nov-01 | 1 2 | | | | | X | | St. | | | | | Coccus | - | |
| 140 | 5.305.9140 | Deliver BE antenna and central hardware for antennas #4 - 9 | 2006-Jul-01 | 1 2 | | | | | | X | Oliver of the Control | | | and the same | | No. | - | |
| 145 | 5.305.9145 | Deliver BE antenna and central hardware for antennas #10 - 17 | 2007-Jan-01 | 1 2 | | | | | Continue | | X | | | | Depart . | and the same of th | - | |
| 150 | 5.305.9150 | Deliver BE antenna and central hardware for antennas #18 - 37 | 2008-Jan-01 | 1 2 | | | | STATE OF THE PARTY | and the same | | | X | Section 1 | | 1 | | - | |
| 155 | 5.305.9155 | Deliver BE antenna and central hardware for antennas #38 -57 | 2009-Jan-01 | | 1 | | | | parameter | | Cleaning | | X | ops. | | | - | |
| 160 | 5.305.9160 | Deliver BE antenna and central hardware for antennas #58 - 64 | 2009-Oct-01 | | AND A TOTAL CO. | | | - | | | | |) | d | - | and | | |
| 200 | 6.315.9200 | Complete design of pre-production boards for prototype correlator | 2002-Dec-30 | | Done | | X | - | | Secretor Sec | | To the same of the | ACTION AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON ADDRESS O | - Contract | - | | NA | |
| 205 | 6.315.9205 | Begin integrated testing of prototype correlator | 2003-Jan-06 | | Done | | X | | Control of the Contro | | | ST COLOR | 2 | State of the lates | | - | NA NA | |
| 208 | 6.315.9208 | Correlator ICDs submitted for approval | 2003-Aug-13 | | Done | | XX | - | | | | Metabolis | | and | - | - | NA | |
| 215 | 6.315.9215 | Pass Critical Design Review | 2003-Oct-31 | | Delay | | (X) | A Comment | | | | | 100 | | - | | NA NA | |
| 225 | 6.315.9225 | Prototype Correlator shipped to ATF | 2003-Dec-15 | | ************* | | 1 | | and | | and the same of th | | Contestion | - | | | NA NA | |
| 220 | 6.320.9220 | Contract signed for Custom Correlator chips | 2003-Oct-31 | | Delay | | X | | Contract of the Contract of th | Carlo | | | out the same | - | The same of the sa | Benediction | NA NA | |
| 222 | 6.320.9222 | Contract signed for Correlator PCB assembly | 2003-Oct-31 | | phil comprises to the | | 1 | | | 100 | | | - | and | | | NA NA | |
| 230 | 6.320.9230 | Begin assembly of first quadrant | 2003-Oct-31 | | Delay | | X | | | | | | Charles In | The same of | 1 | | NA NA | |
| 235 | 6.320.9235 | Begin board testing for first quadrant | 2003-0Ct-3 | | Delay | | 1 | X | | | | | - The state of the | et-constant | | The state of the s | NA NA | |
| 240 | 6.320.9240 | Begin integrated testing for first quadrant | 2004-May-0 | | Delay | | 1 | V | | | | | No. | | and a second | Name of Street | NA NA | |
| 240 250 | 6.320.9240 | First quadrant shipped to Chile | 2005-Dec-31 | | Delay | | personal | ^ | - V | | | - | The same of the sa | ST. CO. | - | No. | INA | |
| | 10.320.9230 | rnst quadrant snipped to onne | 2005-Dec-31 | ı Z | Licitely | 1000 | 1 | 2 | § ^X | | 9 | 1 | - | - | | 1 | | |

| estone # | WBS# | ilestone Summary (Version: 2003sep12b) | Due Dete | 1 | 1.04-1 | | end: L | ever 1. | Lev | OI 2.A | Level | 0.0 | Origina | ai udies | mr gray) | _ | | <u> </u> |
|--------------------------|------------|--|--|--|---|----------|--|--|--|--|--|--|--|--|--|--|--------------|-----------------|
| satone # | MR2 # | Milestone Name | Due Date | Leve | I Status | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | Responsible | Delay (days) |
| 260 | 6.320.9260 | Begin board testing for second quadrant | 2004-Oct-31 | 1 2 | | | |) | X | and the same of th | | 1 | | | | | - | -12 |
| 265 | 6.320.9265 | Begin integrated testing for second quadrant | 2006-Jan-01 | 12 | Delay | | ale and a second | | X | X | | Deposite Control | donate. | | | | - | 24 |
| 275 | 6.320.9275 | Second quadrant shipped to Chile | 2006-Dec-31 | 12 | Detay | | - | | | (X) | ¢ | order or a construction of the construction of | | | | | - | 35 |
| 280 | 6.320.9280 | Begin Integration of third quadrant* | 2006-Oct-01 | - What is not become | Delay | | SOMOOTI . | | | X) | (| | - | | | - | - | 26 |
| 285 | 6.320.9285 | Begin board testing for third quadrant | 2005-Oct-31 | 1 2 | | | MAN TO SERVICE | |) | XX | | to the same | | | STATE OF THE PERSON OF THE PER | | - | -1: |
| 290 | 6.320.9290 | Begin integrated testing for third quadrant | 2007-Jan-01 | 1 2 | Delay | 1949 | 0 | Appropri | Maria | 1 X | X | - | | SOUTH STATES | | - | - | 2 |
| 300 | 6.320.9300 | Third quadrant shipped to Chile | 2007-Dec-31 | 1 2 | Delay | | | - | | | X : | X | aproxima (| | 9 | | - | 3 |
| 305 | 6.320.9305 | Begin integration of fourth quadrant* | 2007-Oct-01 | 12 | Delay | | | SECOND SE | | | X : | X | - | 1 | | and a | - | 2 |
| 310 | 6.320.9310 | Begin board testing for fourth quadrant | 2006-Oct-31 | 1 2 | | | - | Sec. | Clima |) | (X | specific | | | | | | -1 |
| 315 | 6.320.9315 | Begin integrated testing for fourth quadrant | 2008-Jan-01 | 1 2 | Delay | | - | | | Boyesa | X | X | | | | | - | 2 |
| 320 | 6.320.9320 | Fourth quadrant shipped to Chile | 2008-Dec-31 | 1 2 | Delay | | | | | | | X) | | | - | POSTA STATE OF THE PROPERTY OF | - | 3 |
| 350 | 6.325.9350 | Second Generation Correlator Feasibility Study | 2002-Mar-27 | 7 2 | Done | X | - | and the same of th | | | | decond | and the same of | | | and the same of th | EU | |
| 355 | 6.325.9355 | 2GC System Requirements Review | 2003-Nov-30 |) 2 | Delay | | X X | | antois | | account | Control of the Contro | | CONTRACTOR | | - | EU | 1 |
| 360 | 6.325.9360 | 2GC Conceptual Design Review | 2004-Mar-19 | 9 2 | | | - | X | | | | and the same of th | | No. | and the same of th | | EU | |
| 365 | 6.325.9365 | 2GC Preliminary Design Review | 2005-Feb-28 | 3 2 | | 1,192.4 | | | X | | | dentura de la constantina de l | | | and the same of th | | - | |
| 400 | 7.340.9400 | Computing Subsystem Start (T0) | 2002-Jun-01 | 1 2 | Done | X | | | | No. | - | and and | and the same of | | and the same of th | | Both | |
| 405 | 7.340.9405 | Internal Design Review (IDR) | 2002-Dec-09 | 9 2 | Done |) | X | - | AL PROPERTY. | The second | | | - | | | - Contraction | Both | |
| 410 | 7.340.9410 | Preliminary Design Review (PDR) | 2003-May-08 | 3 2 | Done | | X | | | - | | atheteen a | | | | | Both | |
| 415 | 7.340.9415 | Subsystem pre-release (R0) | 2003-May-16 | 5 2 | Done | 100 | X | Marie Company | Delication of the last of the | and the second | Constant | SEPTIME STATES | | | | Medican | Both | |
| 420 | 7.340.9420 | Subsystem Critical Design Review 1 (CDR1) | 2003-Aug-01 | 1 2 | Done | | X | | | della | | distanto | | - | Chester | District Control | Both | |
| 495 | 7.340.9495 | Subsystem Major Release 1 (R1) | 2003-Oct-01 | 1 2 | | |) | | Description of the last of the | Sales Control | | 90000 | | | | | Both | |
| 515 | 7.340.9515 | Integration Release 1 (IR1) | 2003-Dec-01 | 1 2 | | |) × | | Service . | | No. | | | | | | Both | |
| 422 | 7.340.9422 | Submit Computing Communications Study | 2004-Jan-01 | 1 2 | | | | X | | | | The same of the sa | | | | | Both | |
| 425 | 7.340.9425 | Deliver ALMA Operations Plan, Software Aspects | 2004-Jan-01 | 1 2 | | The same | | X | | | | oterato | | | | and the same of th | Both | |
| 430 | 7.340.9430 | Subsystem Minor Release 1.1 (R1.1) | 2004-Apr-01 | 1 2 | nd database years to accom- | | | X | | | | ar colonia | | distance | | | Both | |
| 435 | 7.340.9435 | Critical Design Review 2 (CDR2) | 2004-May-01 | | 1 | | Decourse | X | No. | ED-PORT | | Salesta | | | | | Both | |
| 500 | 7.340.9500 | Subsystem Major Release 2 (R2) | 2004-Oct-01 | | 1 | | |) | | | | et all a second | | | No. | - Change | Both | |
| 520 | 7.340.9520 | Integration Release 2 (IR2) | 2004-Dec-01 | | - | | |) | | | - | de la constante de la constant | - | | Sales Sa | | Both | |
| 440 | 7.340.9440 | Subsystem Minor Release 2.1 (R2.1) | 2005-Apr-01 | | - | | No. | | X | | and the same of th | | - | | | Street | | |
| 445 | 7.340.9445 | Subsystem Critical Design Review 3 (CDR3) | 2005-May-01 | | | | | Spano | X | | | Descript. | | Si di | | | | |
| 505 | 7.340.9505 | Subsystem Major Release 3 (R3) | 2005-Oct-01 | | | | | No. | | x | | | - | D-GE | Name of the last | | _ | |
| 525 | 7.340.9525 | Integration Release 3 (IR3) | 2005-Dec-01 | CONTROL WILLIAM PRIVATE | TO PROPERTY OF THE PARTY OF | 666 | | |) | X | | - Company | 1 | ON THE REAL PROPERTY. | | | _ | |
| 450 | 7.340.9450 | Subsystem Minor Release 3.1 (R3.1) | 2006-Apr-01 | ne most skirkeralinis volu | | | | | | X | | Softman | | | | Obsession | - | |
| 455 | 7.340.9455 | Subsystem Readiness Review (RR) | 2006-Jun-01 | in higher at the budget or between it | | | Character | | | X | | The same of the sa | | - | 1 | | - | |
| 460 | 7.340.9460 | Subsystem Major Release 4 (R4) | 2006-Oct-01 | Militario en en esperado e | - | | | - | |) | | and and | | | | COURT | | |
| 465 | 7.340.9465 | Subsystem Preliminary Acceptance Review (PAR) | 2006-Dec-01 | | | | | | | | d | ACCUPATION OF THE PERSONS ASSESSMENT | | - | Security | Toward . | | |
| 530 | 7.340.9530 | Integration Release 4 (IR4) | 2006-Dec-01 | herometer and a service of | ti edovi seritoria | | | | | | d | The second | | | | | _ | |
| 480 | 7.340.9480 | Computing Preliminary Acceptance (CPA) | 2007-Mar-01 | arrange of the ball of the | | | | Section 1 | | Tourse of the last | x | | - | DOM: | G. | | _ | |
| 510 | 7.340.9510 | Subsystem Minor Release 4.1 (R4.1) | 2007-Apr-01 | Section of the set operations of | | 1000 | To a second | | | - | X | | administration of the second | | | 2000 | _ | |
| 470 | 7.340.9470 | Software Agreements, Final Construction Phase | 2007-Jun-01 | | 1 | | - | | | | X | 1000 | processi | | property | DATE OF THE PARTY | _ | |
| 475 | 7.340.9475 | Support Completion (T1) | 2007-Jun-01 | and with the second commence of the second | - | | 2000 | demon | | replacement of the second | X | Company | - | | | | _ | |
| 485 | 7.340.9485 | Computing Readiness for Interim science observation | 2007-Jun-01 | Address to the Annalysis Alberta Ballin | · | | The state of the s | | National Property | | X | and the same of th | The state of the s | | | | 1 | |
| 535 | 7.340.9535 | Integration Release 4.1(IR4.1) | 2007-Jun-01 | Salardin mainte d'un principal de la companya de la | | | No. | | - | | x | Constitution of the Consti | | 1 | direason . | | | |
| 490 | 7.340.9490 | Complete Subsystem Upgrade | 2011-Jun-01 | | the re-to-construction and the | | - | | Contract of the Contract of th | regenties | 1 ^ | description | and the same of | | X | and the same of th | | |
| 602 | 8.365.9602 | System Requirements Review (SRR) - System Requirements Finalized | 2003-Oct-31 | Section of Artesign Prints. | Delay | 1400 | XX | | d. Control | | CONTRACTOR | Saleston | and the same of th | | 1 ^ | Sweeze | Both | |
| 605 | 8.365.9605 | ALMA System Design Review | 2003-0ct-31 | | Delay | 1 | \ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\ | Y | | and the same of th | | | | | | Merchin | Both | 1 |
| 615 | 8.365.9615 | ALMA System CDR | 2005-Jul-01 | | - CON | | | | X | | The same of the sa | Part Charles | ti deserviti | | on the second | The state of the s | Doll | |
| 650 | 8.370.9650 | Prototype Integration & Verification Plan (Q4 2003 through Q4 2004) approved for Lab & ATF | 2003-Oct-13 | | Delay | | 1 XX | | ^ | | and the same of th | | Section 1 | | | Money | Both | |
| 653 | 8.370.9653 | All hardware for Prototype System Lab Integration accepted and delivered | 2004-Jan-01 | | 1 | 1 | | Y | To distance of the last of the | The same of | - | | and the same | Contract of the Contract of th | Reference | Sections | Both | |
| 656 | 8.370.9656 | AEG Releases Antennas to ALMA System Prototype Integration Group | 2004-Jan-01 | market and resident and advantage | 1 | | The same of the sa | y | Chicago | and the second | | | The second | and the same of | | Charles | Both | |
| 659 | 8.370.9659 | ALMA prototype electronics and software installed on ATF | 2004-Apr-01 | | | | Sections | X | Sherman | 1 | Consulta | | | | and the same of th | Constance | Both | |
| 662 | 8.370.9662 | First interferometer fringes using prototype antennas at ATF | 2004-May-01 | | | | - | Y | | | | No. | Ollection | | - | NOTION AND A | Both | |
| 665 | 8.370.9665 | Discontinue interferometer hardware and software system testing and commissioning | 2004-Sep-01 2005-Jan-01 | | *************************************** | | | ^ | ~ | | amenda in the same | Sheepel | and a second | | No. | Processor | BOIII | |
| 668 | 8.370.9668 | Finish testing of ALMA prototype and production hardware / software on ATF | 2005-Jan-01 2006-Jul-01 | | ***** | | | and the same of th | - | x | Harmon | | - | - | | White the same of | · - | |
| 005 | 8.370.8005 | Start Antenna Evaluation at ALMA Test Facility | NOTE OF THE CONTRACTOR AND | syntheticine triatel bless to | Don- | 1 | 4 | | | * | No. | | - | | | - | N/A | |
| 718 | 8.370.9718 | | 2003-Mar-22 | | Done | | | ~ | | | | | to the same of the | | Sections | naprice. | NA Dotte | |
| Assertance of the second | 8.370.9718 | NA Prototype Evaluation Report EU Prototype Evaluation Report | 2004-Mar-12 2004-May-31 | | Delay Delay | | | X | Service Servic | | organica de la constanta de la | Domeston. | Name of the last | | | No. | Both Both | |
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File: ALMA_amd_2003sep12b.xls Worksheet: Summary

| | ALMA Milestone Summary (Version: 2003sep12b) | | | | | | nd: L | evel 1: | 1 Leve | el 2:X | Level 3 | :0 (| Original | dates in | gray) | | | |
|-------------|--|--|-------------|-------|--|------|--|---------|---------|----------------|--------------|------|----------|--|-------|------|-------------|-----------------|
| Milestone # | WBS# | Milestone Name | Due Date | Level | Status | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | Responsible | Delay (days) |
| 9753 | 8.375.9753 | Establish Integration office at OSF | 2005-Feb-15 | 5 2 | | | | | Χ | | | | | | | | - | luavsi |
| 9756 | 8.375.9756 | Integration team and infrastructure ready at OSF. | 2005-Sep-01 | 2 | en er | | | | X | | | | | | | | - | (|
| 9759 | 8.375.9759 | Initial central electronics and computing - integrated, tested and accepted at OSF | 2005-Nov-15 | 5 2 | A CONTRACTOR OF THE PARTY OF TH | | 2040764 | | X | | | | | DEC. STATE OF THE PARTY OF THE | | | _ | - (|
| 9762 | 8.375.9762 | Initial antenna electronics and computing - integrated, tested and accepted at OSF | 2005-Nov-15 | 5 2 | No. Arrandodmática (Hispania | | | | X | | | | | 202003 | | | _ | - 1 |
| 9765 | 8.375.9765 | First fully outfitted antenna integrated and accepted at OSF | 2006-Feb-15 | 5 2 | | | | | | Χ | | | | | | | - | - 1 |
| 9768 | 8.375.9768 | First fully outfitted antenna integrated and accepted at AOS | 2006-Apr-01 | 2 | or and the second discussion of the second | | | | | X | | | | | | | _ | - (|
| 9771 | 8.375.9771 | Phase 2 ALMA Integration and Verification Plan Q1 2008 and beyond | 2006-Jul-01 | 2 | 0.0001 | | ENTITION . | | | X | | | | and the same | | | - | 1 |
| 9774 | 8.375.9774 | Three antenna array integrated & functioning at AOS | 2006-Aug-01 | 2 | Marie and a strain consumers | | | | | X | | | | and and | | | - | - 1 |
| 9800 | 9.380.9800 | Plan for compact and intermediate configurations submitted | 2002-Nov-27 | | Done |) | d | | | | the state of | | | | | | Both | - 1 |
| 9805 | 9.380.9805 | Review of calibration requirements with science examples complete | 2003-Feb-28 | 3 2 | Done | | X | | | | | | | | | | Both | 13 |
| 9812 | 9.380.9812 | Document on how calibration reqs flow down to instrumental specs | 2003-Jun-30 |) 2 | Done | | X | | | | | | | To the same of the | | | Both | - 1 |
| 9815 | 9.380.9815 | Plan for Y+ configuration submitted | 2003-Jun-30 |) 2 | Done | | X | | | | | | | Public Park | | | Both | - 1 |
| 9820 | 9.380.9820 | Calibration strategy submitted | 2003-Oct-31 | 2 | Delay | | XX | | | and the second | | | | 200 | 100 | | Both | 3 |
| 9825 | 9.380.9825 | Science aspects of operations plan complete | 2004-Jun-30 |) 2 | Delay | | X | X | | | | | | Control | | | Both | 182 |
| 9830 | 9.380.9830 | Plan for early science configurations complete | 2004-Jun-30 |) 2 | | | | X | | | | | | | | | Both | 1 |
| 9835 | 9.380.9835 | Report WVR strategy / implementation / operations | 2004-Sep-30 | 2 | | | | X | and and | | | | | and the second | | | EU | - 1 |
| 9840 | 9.380.9840 | Review of tests of calibration strategies on prototype interferometer complete | 2004-Dec-31 | 2 | | | | X | | | | | | | | | Both | - 1 |
| 9843 | 9.380.9843 | Review of tests of calibration strategies on ATF interferometer | 2005-May-30 |) 2 | | | | | X | | | | | | | | - | - 1 |
| 9845 | 9.380.9845 | Science verification plan for commissioning submitted | 2005-Jun-30 | 2 | | | | | X | | | | | 2000 | | | - | - 1 |
| 9870 | 9.380.9870 | Definition of site characterization instrumentation for ALMA operations | 2006-Jan-31 | 2 | | | Control of the Contro | | | χ | | | | as a second | | | _ | (|
| 9850 | 9.380.9850 | Science verification of ALMA early science array Bands 3, 6, & 7 complete | 2007-Jul-31 | 2 | | | | | | | X | | | | | | - | (|
| 8045 | 9.380.8045 | Start Early Science Operations | 2007-Sep-30 | 1 | | | | | | | 1 | | | Street | -71- | | Both | (|
| 9855 | 9.380.9855 | Science verification of ALMA Band 9 complete | 2008-Sep-30 |) 2 | | | NO. | | | | | X | | and the same of th | | CO. | - | (|
| 9860 | 9.380.9860 | Science verification of ALMA imaging quality | 2009-Dec-31 | 2 | Printed representationary | | | | | | | | X | | | | - | - (|
| 9865 | 9.380.9865 | Final Science verification complete array | 2011-Dec-31 | 2 | | | - | | | | | | | | > | | - | (|
| 8055 | 9.380.8055 | Start of full Science Operations | 2012-Mar-31 | 1 | 1 | | | | | | | | | and | | 1 | Both | - (|



Memorandum

2003-Sep-15

TO:

ALMA Management IPT

FROM:

Richard Simon

SUBJ:

ALMA Milestone Issues

This memo highlights significant issues that arose during the recent review of ALMA milestones. It may be possible to resolve some of these issues during the ALMA meetings being held this week in Richmond, VA. The detailed issues outlined below should be clarified and confirmed with the IPTs involved **before** specific actions are taken.

Management IPT

The Management IPT has two "Late" milestones – milestones for which the due date has passed, and for which there is no revised date. These are the only milestones marked as "Late": in the 2003-Sep-12b plan.

| | Designation of responsibility for Phase 2 development work elements in | |
|------|--|-------------|
| 8105 | Europe | 2003-Sep-15 |
| 8122 | Executives submit 2004 budget and financial projections to JAO | 2003-Sep-01 |

The delays in 8105 have the potential to cause serious delays in several areas. Apparently, the temporary solution to this issue is that the institutions involved are allowing work to proceed in advance of and in anticipation of formal contracts.

Milestone 8410 (Start Operations Budget) has been moved from Site Development to Management.

There are no milestones associated with finalizing JAO plans during Construction, or completing the recruitment of Key staff for the JAO (e.g., Project Manager, Project Scientist, and Project Engineer).

Site Development IPT

A number of milestones for the Site IPT have been delayed. Sources of delay include the following: delays in site access (now resolved); delays in approving specification for the AOS technical building; delays caused by the specification and design of the unified antenna foundation; and delays related to contracting. There is a potential for further delay if the contract for design of the OSF is not signed by 2003-Oct-01; the Site IPT deemed this a critical issue. The current Site development plans project that the initial AOS building and OSF facilities will be completed. The following key milestones have been affected:

| 8025 | Initial Phase of Civil Works in Chile Complete (Level 1 milestone) | 2005-Jun-30 |
|------|--|-------------|
| 8266 | AOS Buildings Finish & Installations NA Provisional Acceptance | 2005-Dec-31 |
| 8348 | OSF Facilities Phase 1 (Tech area) EU Provisional Acceptance | 2006-Feb-01 |

Accommodating the delays in 8266 will be difficult; installation of the correlator and central Back End equipment depend on completion of the AOS technical building. The delays in 8348 may have less impact, since high priority facilities can be readied first, and temporary facilities utilized for offices and storage if necessary. Meeting 8025 will depend on the detailed definition that is adopted; the current schedule will cause a delay in 8025, if 8025 is defined to include completion of the AOS technical building and the Phase 1 OSF facilities.

Site Development has moved milestones for the inner foundations (outside of the Central Cluster) forward in time, while delaying the Central Cluster foundations. This change was necessitated by delays in final specifications for the Central Cluster, and will allow foundation work in Chile to begin without any overall delay. Completion of the Central Cluster (milestone 8228) is now delayed until 2007-Jun-30, from 2005-Jun-30, while Provisional Acceptance of the inner North American foundations is advanced from 2007-Jun-01 to 2006-May-31. This change means that initial integration and commissioning of ALMA antennas may need to use foundations outside the Central Cluster.

Site Development may face additional delays if milestone 8360 (Freeze Fiber Optics and Electrical Specifications) is not met. The Site IPT suggests that this milestone should be the responsibility of System Engineering, with a revised date of 2003-Dec-31.

Antenna IPT and the Antenna Evaluation Group

There have been significant delays in key antenna milestones in recent months. These delays have been driven primarily by contractor performance, and secondarily by management decisions and limited resources. The key Antenna milestones affected by recent developments are:

| 8525 | CFT/RFQ Bid Package Submitted to Project Office (AEC/VertexRSI) | 2003-Sep-30 |
|------|---|-------------|
| 8530 | Shared Access AEC Antenna (Preliminary Acceptance) | 2003-Oct-10 |
| 8535 | Issue CFT/RFQ for Production Antenna Design(s) | 2003-Oct-31 |
| 8540 | Provisional Acceptance of AEC Antenna | 2003-Nov-21 |
| 8510 | Complete Technical Performance Report-VertexRSI Antenna | 2003-Dec-10 |
| 8545 | Complete Technical Performance Report-AEC Antenna | 2004-Jan-21 |
| 8550 | Closing Date for Production Antenna Bids (Competitive Tender) | 2004-Feb-28 |
| 8560 | Bid Evaluations Due to Project Office | 2004-Apr-30 |
| 8565 | Sign Contract for 31+1 North Am. Production Antennas | 2004-Jul-28 |
| 8575 | Sign Contract for 32-Euro Production Antennas | 2004-Jul-28 |
| 8524 | Prototype Antenna released to Contractor for Refurbishment / Transport to Chile | 2004-Aug-28 |
| 8585 | First Antenna Arrives at OSF (Retrofitted prototype TBC) | 2005-Oct-31 |
| 8035 | First Production Antenna available in Chile at OSF | 2005-Dec-31 |

System and AEG milestones related to Antenna evaluation, testing, and procurement:

| 9718 | NA Prototype Evaluation Report | 2004-Mar-12 |
|------|---|-------------|
| 9659 | ALMA prototype electronics and software installed on ATF | 2004-May-01 |
| 9721 | EU Prototype Evaluation Report | 2004-May-31 |
| 9656 | AEG Releases Antennas to ALMA System Prototype Integration Group | 2004-Jun-01 |
| 9662 | First interferometer fringes using prototype antennas at ATF | 2004-Sep-01 |
| 9665 | Discontinue interferometer hardware and software system testing and commissioning | 2005-Jan-01 |

The above schedule cannot be met without the resolution of several issues:

- 8530 is dependent on contractor performance, but appears possible. Achieving 8540 as scheduled is more problematic, since it is dependent on both contractor performance and no unexpected technical problems. Delays in 8540 will cause delays in 8545, and the System IPT milestones 9721 and 9656.
- 9659 cannot be met as scheduled, since it is dependent on 9656. Correcting this would schedule 9659 for 2004-Jul-01, representing an additional 2-month delay.
- The amount of time between 8560 and 8565 has been reduced from 5 months (the minimum amount of time thought to be required a few months ago) to an aggressive 3 months. Informal discussions suggest that 4 months is an optimistic minimum.
- The Antenna IPT has proposed milestone 8524 with a date that does not allow for the completion of testing at the ATF. The conflict is potentially more serious than the above schedule suggests: in informal discussions, a more realistic date for milestone 9662 (first fringes) might be 3 months or more after the nominal 2003-Sep-01.
- The Systems group apparently would like to delay 9665 until there are enough antennas in Chile for testing and commissioning activities.
- The milestones related to the first production antenna (8585 and 8035) should be clarified. For several IPTs, the key date is the actual delivery of the outfitted antenna to the AOS. In addition, a new milestone for delivery of Antenna #2 to the AOS is needed; the Front End and Back End IPTs are planning final verification tests before production that will require the use of two antennas at the AOS.
- It is essential that the necessary logistical support, facilities, and nascent operational capabilities be present in Chile at the time of antenna assembly and delivery.
- Although the project remains committed to meeting 8035, the Level 1 milestone for the first antenna in Chile, performance to date suggests that this milestone may not be met. The potential for delay of 8035 arises from the following causes:
 - Vendor delays in delivering prototype antennas and resolving technical problems;
 - The requirement for serial rather than parallel radiometric testing and evaluation of the prototype antennas, since only a single nutator is available;
 - An unknown time requirement to refurbish a prototype antenna for shipment and installation in Chile, complicated by the required redesign of the antenna pedestal.
 - The probable need for additional time for ATF interferometry and system prototype testing;
 - Potential delays in the procurement process.
 - The possibility that delivery of production antennas in Chile will begin about two years after the contract is awarded.

Front End IPT

Contracting delays and a lack of resources have resulted in delays in some Front End milestones. The following issues are noted:

Uncertainty about the technical performance of the Front End portion of the LO will persist until tests are completed near the end of 2003; unexpected technical issues could delay this further.

Formal work on the design of the Integration Center (Milestone 8975, delayed from 2003-Oct-01 to 2004-Jun-01) has barely started; the estimated delay for the Integration Center amounts to 8 months. However, the FE IPT expects to recover this time during the integration of the first Front End. In effect, setting up and debugging the Front End integration process will happen in parallel with the integration of the first Front End.

Delays in milestone 8995 (All FE Contracts / Agreements in place) may cause delays to some activities. Difficult contracting issues remain unresolved. Delivery of the initial cartridges for Bands 7 and 9 are dependent on the resolution of these issues.

The recent delays in Front End development are expected to be recovered during the production of the 8 initial Front Ends.

Release for production of all Front Ends depends on the availability of 2 antennas at the AOS to verify performance of the Front Ends and related systems. In particular, milestone 9020 (Receiver CDR on 2006-May-01) depends on the successful completion of initial interferometry tests at the AOS.

Milestone 9023 (Front End Production Authorized) is presently scheduled for the same day (2006-May-01) as passing the Front End CDR. Is this realistic, or will the JAO and the Executives need time to review the CDR report before approval of the start of production?

A new level 2 milestone may be needed to mark completion of the planned FE design/manufacturing readiness review. Such a milestone would follow 8922 (Freeze FE Design, 2004-Jul-01).

A new definition and new baseline date was adopted for milestone 9025 (Issue RFP for FE Service vehicle). The change in definition and date are consistent with earlier plans, and do not imply any delay.

Back End IPT

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The first Level 2 milestone scheduled for the Back End System, Milestone 9100 (Deliver BE modules for system integration, 2004-Jan-01), is not likely to be met as scheduled, but partial deliveries should allow Lab integration to start nearly on time. If milestone 9100 is interpreted as including a full prototype LO system, the LO development plans imply that 9100 will be a year later than currently scheduled.

The current Back End plan may need significant revision. The IPT leaders would prefer to hold a final CDR and release for production after end-to-end tests using actual prototype receivers and a prototype of the ALMA LO system. These tests will not be possible until early 2006, based on the current Front End schedule and development plans for the LO distribution portion of the LO system. There are at least two possible solutions to this conflict:

- Release to production based solely on the results from laboratory testing. Initial installation and testing in early 2006 could then use the production units, but any problems encountered might be expensive to resolve. This approach is hampered by the late availability of prototypes for the IF Distribution system.
- Adopt an approach similar to that planned for the Front End, where an initial production run of hardware for 8 units is planned, with release for full production occurring after full system tests. The cost and schedule implications of this approach may be complex and have not been explored in detail.

Three level two milestones (below) have been added to reflect current plans for the completion of the prototype IF distribution system. The schedule implications for these milestones have not been explored in detail.

| 9115 LO Phase Correction Demonstration | 2003-Dec-31 |
|--|-------------|
| 9117 End to End LO Demonstration | 2004-Dec-31 |
| 9119 Pre production LO Review | 2005-Mar-31 |

There are two level 1 milestones scheduled for the Back End IPT, which are not clearly defined. They both appear to be earlier than is reasonable.

Correlator IPT

While the Correlator schedule has slipped a few months, the current schedule accounts both for the scheduled CDR and the detailed procurement plans. The current Correlator schedule easily meets the overall ALMA schedule.

Shipment of the first quadrant of the Correlator is dependent on the completion of the technical building at the AOS. Further slips in the technical building would start to delay shipment of the first quadrant of the correlator.

Milestone 9255 (Begin integration of second quadrant, 2005-Oct-01) requires that adequate power and space are available for two correlator quadrants to run simultaneously.

Computing IPT

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The Computing IPT plans are dependent on the availability of an operations plan. In particular, 9435 (Critical Design Review 2, 2004-May-01) depends on the existence of an operations plan by the end of 2003. The nominal plans for ALMA computing have always assumed that there will be a basic operations group to receive software releases, as well as to provide support.

Milestone 9465 (Subsystem Preliminary Acceptance Review (PAR), 2006-Dec-01) is dependent on computing, communications networking infrastructure (including links to external sites) being in place sometime in 2005. The PAR is expected to be held in Chile. 9465 is closely followed by 9480 (Computing Preliminary Acceptance, 2007-Mar-01), which is similarly dependent on Operations support.

Although nominally Level 3 milestones, 70319 and 70320 are awaiting completion of ICDs for LO and BE to FE. This issue should be discussed during the 2003-September ALMA week.

System Engineering and Integration IPT

Issues related to the Antenna Evaluation Group have been discussed above, in conjunction with the Antenna discussion.

The System group proposes shifting 9605, ALMA System Design Review, from 2003-Dec-01 to 2004-Mar-31, and holding it in conjunction with an ALMA week during first quarter 2004.

Milestone 9659 (ALMA prototype electronics and software installed on ATF, 2004-May-01) depends on unformulated plans for a temporary LO system of some sort. It appears that a prototype of the ALMA LO, even for Bands 3 and 6, will not be available until several months later.

The System and Back End groups expressed no confidence that the date for achieving First Fringes on the ATF (Milestone 9662, 2004-Sep-01) could be achieved. A more realistic date, assuming no major technical problems or delays, may be 2004-Dec-01.

There is a significant conflict between the current plans to remove one of the prototype antennas from the ATF for refurbishment and shipment to Chile, and the need to complete prototype system integration and testing on the ATF. The currently scheduled date for 9665 (Discontinue interferometer hardware and software system testing and commissioning, 2005-Jan-01) is estimated to be 18 months earlier than ideal. The clear message was that "Discontinue" does not mean "Complete".

The interaction/conflict of the ALMA System CDR (Milestone 9615, scheduled for 2005-Jul-01) with the plans for the Front End / Receiver PDR (milestone 9020, 2006-May-01) must be resolved. At the current date scheduled for the System CDR, the current plans are that the ALMA Front Ends will be fully prototyped or ready for review.

Science IPT

Several of the Level 2 Science milestones depend on the availability of a working draft plan for ALMA Operations.

The Science IPT has lost several staff in recent months, and may face delays in completing some milestones.

Operations Planning Group

This group is working without any published milestones or goals.

ALMA Safety Committee

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It is unclear whether or how to incorporate the Safety related milestones into the overall ALMA Milestone Plan.