



SMT IF Upgrade 2006

Engineering Minutes

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An engineering meeting was held Friday morning, 21 Jul 2006 to discuss Phase I capabilities and project status and schedules involving the SMT IF upgrade and the 1.3 mm side-band separating receiver. Attending the meeting were Dr. Lucy Ziurys, Tom Folkers, Dave Forbes, Gene Lauria, George Reiland, and Robert Freund. The topics discussed were:

1. Purchasing account numbers
2. Phase I capabilities
3. Current project status and schedule.

Tom started the meeting by distribution FRS (account) numbers and Unit information. The Project FRS number is 11132 and the Unit information is "IF13". Because the University purchasing system shuts down for about three weeks at the end of the fiscal year, Tom will check with Mark Buglewicz on the status of all our recently placed orders.

There was a lot of discussion about University purchasing policy. One worry was unintentionally getting caught in a purchasing "pyramid" situation. There was no answer as to the correct procedures on placing a large P-card order, for example amplifiers, that didn't exceed any limits, and then, sometime in the future, an amplifier fails. If the replacement order was placed for the exact item on the P-card, the yearly total for that vendor might exceed the limit.

Gene started a discussion to clarify the essential tasks to complete Phase I. He based the discussion on Bob's "Upgrade Sequence" list distributed June 29 and then modified July 13. There were 5 major tasks:

1. dual- polarization sideband separating cartridge construction
2. Dewar modifications
3. vintage dual-channel total-power IF processor
4. IF Channel Steering Selector (cross-point switch)
5. IF Converter System.

These tasks provide the "classic" spectrometer capabilities of the single polarization ALMA evaluations.

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Dave indicated that the block diagram was incorrect. The Filter Bank spectrometer would only accept 2 inputs, not 4, as shown and the IF Channel Steering Selector would not be available. The former revelation caught some by surprise. He estimated that converting the Filter Banks from 2 inputs to 4 would take about 2 weeks and would be scheduled for sometime during the winter.

A decision was taken to order all necessary parts and to accomplish the filter Bank conversion during the summer.

Tom asked that connections between the two total power instruments and the digital backend be shown on the Phase I block diagram.

A discussion followed on different methods to set the "JT" IF power levels correctly for the two AOS units. A decision was taken to have Tom provide an AOS Signal Level Window on the JT tuning display. This display will function similarly to the display provided by the oscilloscope in the Left Receiver Room.

Tom indicated that computer HOST 1 in the Left Receiver Room would be replaced. It's functionality would be supplied by the FMS computer. A discussion followed on what should be the priority of this task. The priority level was left unresolved.

Next, the discussions focused on the Interim Receiver Selector and the number of signals needed to drive the 4 IF Converters. A decision was taken to manually select the IF signal paths from the Left or Right Receiver Room. Initially there would be no computer control. These two IF signals would then drive four IF Converter Modules to simultaneously drive the Filter Bank Spectrometers and the AOS units. IF power splitters would be inserted between the Interim Receiver Selector and the IF Converter System.

Bob will incorporate all the changes into a new block diagram.

1. Bob summarized the 10 Phase I tasks:
2. Receiver Frontend - cartridge issues

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3. Receiver Frontend - Dewar issues
4. Receiver Support Electronics - card cage, bias circuits
5. Receiver LO System
6. Receiver IF - modify IF Processor
7. Interim Receiver Selector
8. IF Converter System
9. AOS IF Processor modifications
10. Filter Bank input modifications
11. Control software

Gene was concerned that the delivery of the 10.4 GHz bandpass filters for task 7 with a quoted 10 week lead-time would adversely affect the schedule. Their expected delivery would be approximately 26 September.

Gene summarized the 6 task areas on his Gantt chart:

1. Cartridge
2. Dewar,
3. support electronics
4. LO system
5. IF Converters
6. Software.

New tasks on his list were software and Dewar upgrades; a new spider and a higher capacity heater.

Gene discussed his areas of concern. Listed below, along with Gene's concerns, are suggested solutions.

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1. Differences in length dimensions within the cartridge. Tom indicated that John Fitzner was available part-time to work with us.
2. Item #37 - mixer bias supply improvements. Its priority will be reduced. This hardware can be installed later in the observing season.
3. Item #49 - 4-Channel IF Processor. The response of the 4 - 8 GHz filters will be analyzed in the region from 8.8 to 13 GHz to determine their susceptibility to interference from the Gunn reference signal. The construction of this equipment has been deferred to a later time. The existing 2-Channel IF Processor will be used initially.
4. LO Gunn reference frequency selection. Standard Ciao Wireless amplifiers may operate over the 9 - 13 GHz range, slightly outside their standard 8 - 12 GHz range.
5. Item #90 - waveguide components. George prefers using coined silver waveguide and flanges. He plans to order these components today. The 2 mm LO design does not change.
6. Item #110 - IF Converter crate components. George has requisitions to be signed for the 100 MHz and 15.4 GHz phase locked oscillators.
7. Item #125 - IF Converter controller board. Ernie Kemp has been contacted and indicates that the layout plans should be filed in his file cabinet that is stored in Kitt Peak lab. If the original plans cannot be located, Frank Gacon may create new ones.
8. Item #145 - order DROs. Dave indicates that the frequency of the existing 2.8 GHz PLL oscillators can be tuned lower to 2.7 GHz for use in the AOS signal processors.

The 2 action items are summarized below:

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1. Tom will contact the Mark Buglewicz to check status of all recently placed purchase orders.
2. Add total power connections to the digital backend on Phase I block diagram.

The 3 decisions taken are described below:

1. Order all necessary parts and to accomplish the Filter Bank conversion during the summer.
2. Tom will provide an AOS Level Window on the JT tuning display.
3. The dual-channel IF signal paths from the Left or Right Receiver Room would be manually selected.

Robert

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