

WBS	Level	ID	Name
6.1	3	WBS-477	Multi-System Command Sequencer
Phase	WBS Element		Deliverable
PD			
DD			
FSD			
DC			

WBS	Level	ID	Name
6.1.1	4	WBS-478	Sequencer Infrastructure
Phase	WBS Element		Deliverable
PD	Produce a preliminary design based on SD requirements, including definitions, communication protocols and standards, system interfaces (hardware and software), and documentation required for interfacing command to and coordinating the NGAO sub-systems and with the instrument sequencer. The infrastructure for this WBS needs to be consistent and coordinated with the infrastructure for the AO subsystem (WBS 4.4) and NGAO subsystems overall (WBS 3.6 and 3.7).		1) Detailed design document for the coordination sequencer, command interface, data interface and system health. 2) Functional requirements for the software 3) Preliminary Operation Concept Document 3) Develop Modules Definitions 4) Detailed design document for the hardware
DD	Produce a detailed design for the MCS infrastructure that is consistent and tested to work with the other subsystems.		1) Final functional requirements for the software. 2) Final design document for the hardware 3) Test plan for the MCS infrastructure 4) Module Level Design, Description and Specifications 5) Final OCD
FSD	Procure, build the MCS. Perform unit testing for the MCS. Document results.		1) Procure and assemble hardware 2) Software modules written and tested internally 3) MCS Manual 4) Acceptance test plan at the telescope
DC	The effort for the DC phase has now been added to Lab I &T and Telescope I&T.		See support material on twiki

WBS	Level	ID	Name
6.1.2	4	WBS-479	Setup Sequences: Configurations & Calibrations
Phase	WBS Element		Deliverable
PD	Produce a preliminary design based on SD requirements and the updated observing scenarios for the various sequences to configure and calibrate the NGAO system and the science instruments. The infrastructure for this WBS needs to be consistent and coordinated with the AO sequencer (WBS 4.4) and the diagnostic tools (WBS 4.3).		1) Functional requirements for the software modules 2) Preliminary Operation Concept Document 3) Modules definitions 4) Prototype for some of the calibration modules (e.g, img sharpening)
DD	Based on PD phase for this WBS and the deliverables from the System Architecture, produce a detailed design document and a test plan for the setup sequences.		1) Final functional requirements for the software modules. 2) Final design document for the hardware (if necessary) 3) Test plan for the sequences 4) Module Level Design, Description and Specifications
FSD	Procure, build the setup sequences and integrate with the subsystem sequencers (AO) in the lab.		1) Software modules written and tested internally 2) Setup Sequences Manual 3) Full integrated tests with AO sequencer 4) Acceptance test plan at the telescope and with other subsystems
DC	The effort for the DC phase has now been added to Lab I &T and Telescope I&T.		See support material on Twiki

WBS	Level	ID	Name
6.1.3	4	WBS-480	Observing Sequences
Phase	WBS Element		Deliverable
PD	Produce a preliminary design based on SD requirements and the updated observing scenarios for the three following classes of observing sequences: 1) Acquisition sequences, 2) Observing Sequences, and 3) Performance Monitoring and Optimization for the NGAO system science operations. The design for these sequences needs to be consistent and coordinated with all other (sub) sequencer (AO, telescope and acquisition, laser, and instrument).		1) Functional requirements for the software modules 2) Preliminary Operation Concept Document 3) Command interface and status simulator for the subsequencers 4) Built and tested prototype for the software modules
DD	Detailed design for the Observing Sequences (1) Acquisition sequences, 2) Observing Sequences, and 3) Performance Monitoring and Optimization). This effort required a coordinated effort with the subsystem sequencers.		1) Test report with prototype using the subsequencer simulator or/and the subsequencers when possible 2) Final functional requirements for the software modules. 3) Final design document for the hardware (if necessary) 4) Test plan for the observing sequences (lab, daytime, on-sky) 5) Configuration Control Plan for the observing sequences 6) Final OCD
FSD	Procure, build the observing sequences (1) Acquisition sequences, 2) Observing Sequences, and 3) Performance Monitoring and Optimization) per DD phase reports and integrate with the subsystem sequencers in the lab.		1) Software modules written and tested internally and with simulator 2) Sequences Manual for 1) Acquisition sequences, 2) Observing Sequences, and 3) Performance Monitoring and Optimization 3) Full integrated tests with other subsequencer (this could be sequential tests with one subsystem at a time) 4) Acceptance test plan at the telescope and with other subsystems
DC	The effort for the DC phase has now been added to Lab I & T and Telescope I&T.		

WBS	Level	ID	Name
6.1.4	5	WBS-481	System Health and Troubleshooting
Phase	WBS Element		Deliverable
PD	Produce a preliminary design based on SD functional requirements, the system design report and the updated observing scenarios for 1) System Health sequences, and 2) Troubleshooting sequences for the NGAO system during science operations. The design for these sequences needs to be consistent and coordinated with all other (sub) sequencer (AO, telescope and acquisition, laser, and instrument).		1) Functional requirements for the software modules 2) Preliminary Operation Concept Document 3) System health and status simulator for the subsequencers 4) Built and tested prototype for the software modules
DD	Detailed design for the MCS for System Health and Troubleshooting. This effort required a coordinated effort with the subsystem sequencers.		1) Test report with prototype using the subsequencer simulator or/and the subsequencers when possible 2) Final functional requirements for the software modules. 3) Final design document for the hardware (if necessary) 4) Test plan for the observing sequences (lab, daytime, on-sky) 5) Configuration Control Plan for the sequences 6) Final OCD
FSD	Procure, build the System Health and Troubleshooting per DD phase reports and integrate with the subsystem sequencers in the lab.		1) Software modules written and tested internally and with simulator 2) System Health and Troubleshooting Sequences Manual 3) Full integrated tests with other subsequencer (this could be sequential tests with one subsystem at a time) 4) Acceptance test plan at the telescope and with other subsystems
DC	The effort for the DC phase has now been added to Lab I &T and Telescope I&T.		See material on Twiki