Title: Primary Mirror Cover Design Requirements for the WIYN 3.5 Meter Telescope

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1. Purpose & Scope

This document defines the design requirements for the Primary Mirror Cover ("the cover").

2. General Description

The WIYN Telescope is an altitude over azimuth configuration with a 3.5 m diameter primary mirror. The cover resides on the telescope elevation platform above the center section (ring beam) and is decribed in the OSS coordinate system (Xo,Yo,Zo) described in WODC TBD. The cover can be operated in any telescope pointing position from 0° to 90° zenith angle and under the operating conditions described later.

When closed the cover will protect the primary mirror, tertiary mirror, wide-field corrector and Cassegrain optics (if any) from dust, ice or rain that might fall into the dome upon opening the dome shutter, and from accidental damage from falling tools or personnel.

When open the cover provides a completely clear circular aperture at least 139" in diameter centered on the optical axis of the telescope. When open the cover will provide minimum "sail" area.

The cover will be of lightweight design to add minimal thermal inertia to the telescope. Powered mechanisms will be off during observing so as not to dissipate heat above the primary.

Some service and maintenance tasks require access to the primary mirror with the telescope at horizon pointing; the cover should not impede this access.

3. Requirements

3.1 Dust, Water, Snow & Ice

The cover shall be dust and water proof and designed to prevent dumping collected dust, water, snow or ice onto the primary during opening. The cover itself should not be a source of dust due to wear in normal operation, or be a source of potential liquid contamination to the optical surfaces from lubricants, hydraulic fluids or the like.

3.2 Impacts & Loading

The cover will protect the primary from blunt impacts of 20 kg-m/s or less. We do not intend to walk on the cover, however the cover will be designed to support an 80 kg person without catastrophic failure.

3.3 Opening & Closing

Motorized actuators shall be provided for operating the cover. Limit switches shall be provided for the full open and full closed positions. The status of the limit switches shall be available to the operator through the control system. It shall be part of the Control System task to provide the control for motors and switches.

The mirror cover shall operate reliably in all conditions. The times to open and close shall not exceed 30 seconds. Power will be removed from the actuators when the cover is not being operated. The cover will hold its position with the power off.

3.4 Clearance for Tertiary

The tertiary baffle is designed in a "split level" two part configuration with a tubular baffle which resides above the cover supported by two 3/4" thick blades from the lower part of the baffle which resides below the mirror cover. The cover must meet in the approximately 6" clear space between the two parts of the tertiary baffle and seal around the support blades. See Figure TBD.

3.5 Safety Interlock

The WIYN telescope will be equipped with a rotating tertiary and baffle and may be equipped with a tertiary tilt mechanism. Both these mechanisms may create a potential interference between the mirror cover and the baffle or mirror. An unsafe status signal will be available to lockout cover closure when there is a danger of an interference. Implementing this interlock will be part of the control system task.

3.6 Telescope Balance

Opening or closing the mirror cover shall not change the telescope balance along the Z_O axis by more than TBD ft-lb and along the Y_O axis by more than 20 ft-lb.

3.7 Failure Modes

The cover will have no failure mode that imperils the mirror with falling parts or hardware. A procedure for closing the covers in the event of loss of power or failure of the automatic controls shall be provided.

3.8 Servicing

All mechanisms shall be accessible from above the cover. None will require working above the unprotected primary mirror.

3.9 Corrosion Protection

All parts of the cover shall be designed to resist the effects of corrosion principally due to moisture. Fasteners shall be stainless steel or zinc plated. Electrical equipment shall be adequately sealed.

4.0 Environmental

Operating temperature:	0°F to 90°F
Storage temperature:	-20°F to 120°F
Wind:	30 mph.
Humidity:	Up to 100%.
Elevation:	6838'.
Earthquake zone:	UBC zone 2.