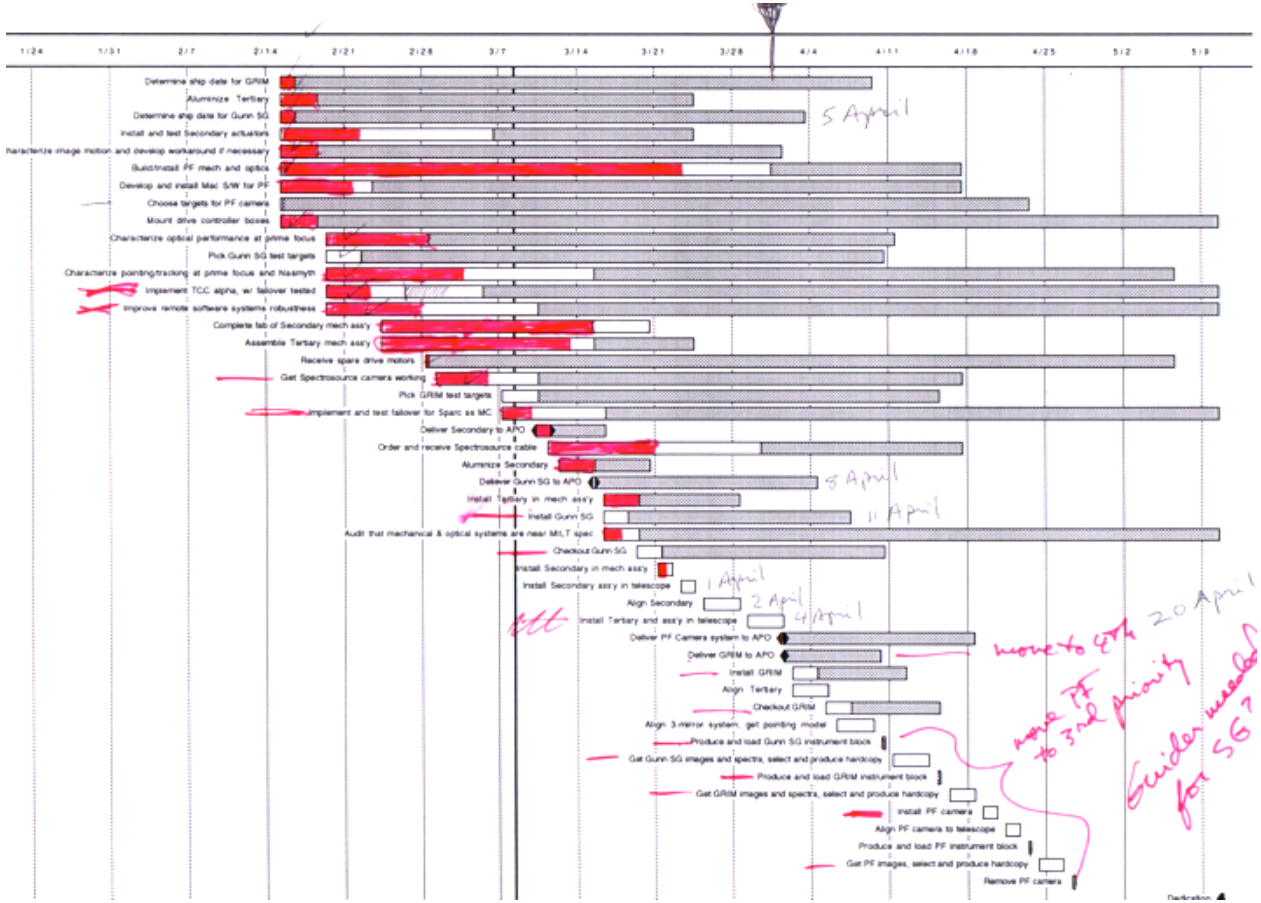
The situation in early 1993

- Telescope and site structures completed, but
  - primary mirror in box, PMSS under construction
  - 2ndary and tertiary mirrors being polished
  - no instruments yet at site
- SDSS construction started, but full funding commitments pending
- Arranged for [Margon?] solar eclipse on 10 May 1994, use occasion to hold dedication of 3.5-meter telescope
- Left about a year to bring the telescope and instruments into operational state

And so, “a miracle happens here”



Telescope dedicated (while observing the sun during eclipse), and was operational for science that night.

Vision, reality

Remote hands-on internet operation: [still] works great

Fast-change multi-instrument capability: manual at first; heading toward multi-port fast change capability [got it]

Excellent pointing and tracking: 1 arcsec goal; can usually point to within ~few arcsec [or better]

Excellent delivered image quality: 0.5 arcsec goal; often sub-arcsecond, but still feel we could improve about .3 arcsec [median seeing still about 1 arcsec]

Full suite of science instruments: Got them, upgraded them, have plans and paths to replace aging instruments [and continuing to this day]

["Partner" user support model; high priority on telescope and facility maintenance; recruit and retain an excellent staff]

Ten years of improvements, e.g.,

- **1994-96**: adaptive optics tests, added offset guider, calibration lamps, laser guide star tests, replaced enclosure wheels
- **1997-98**: commissioned SPIcam, new M1 support servo, 2ndary bracing and stiffening, DIS slit viewer, commissioned Echelle, thermal management program, automated cal lamps
- **1999-2000**: New 2ndary mirror, rotation and tilt of tertiary, telescope monitoring telemetry system, S-H optics tester and collimation procedures, new gratings for DIS, 100-baseT LAN
- **2001-04**: aluminum flooring, DIS upgrades, new remote observing software, stray-light baffles completed, NIC-FPS delivered
- [Annual site operations meetings organized over 10 years]
- **Future**: fast guiding [nope], more instrument rotators [one], mirror coating facility [nope], new axis controllers [yes], auto-focus [yes], 2ndary/tertiary supports & actuators [yes]

August 20, 2001

November 7, 2001

Visiting Instruments [in first decade]

- 10-micron array - Dan Gazari
- 12-micron spectrograph - Don Jennings
- **Drift-scan Camera - Tim McKay, Jim Annis**
- **SPIcam - Chris Stubbs**
- **Goddard Fabrey-Perot imager - Bruce Woodgate**
- AOTF - John Hillman, Nancy Chanover
- **ChAOS, ChILE - Ed Kibblewhite**
- InSB IR Camera - Bruce Woodgate
- LLNL FTS - Chris Stubbs
- **Amber Camera - Dick Newton**
- InSB IR Camera - Sean Casey
- **APOLLO Lunar Ranging- Chris Stubbs**
- CorMASS - Mike Skrutskie, John Wilson

Future roles, challenges for our mid-sized telescope

[as seen in 2004]

- 4-m telescopes now considered “small”*

- put priority and resources toward dedicated and specialized projects uniquely matched to the telescope and its instrumentation

- remote observing access + fast instrument change enables innovative observing modes, opening new kinds of scientific exploration and educational experiences, most not well suited for largest telescopes

*see T. Oswalt’s *Science in the Shadow of Giants: The Future of Small Telescopes*

New roles, observing modes

[as seen in 2004]

- Niche science opportunities:
  - fast-response observations of transient phenomena
  - remote-control, queue-scheduled observations
  - large (and backup) programs
  - synergy with other telescopes, follow-up observations
  - surveys, synoptic and temporal monitoring programs
  - solar system programs
  - new instrument testing
- General-purpose programs
- Outreach and teaching