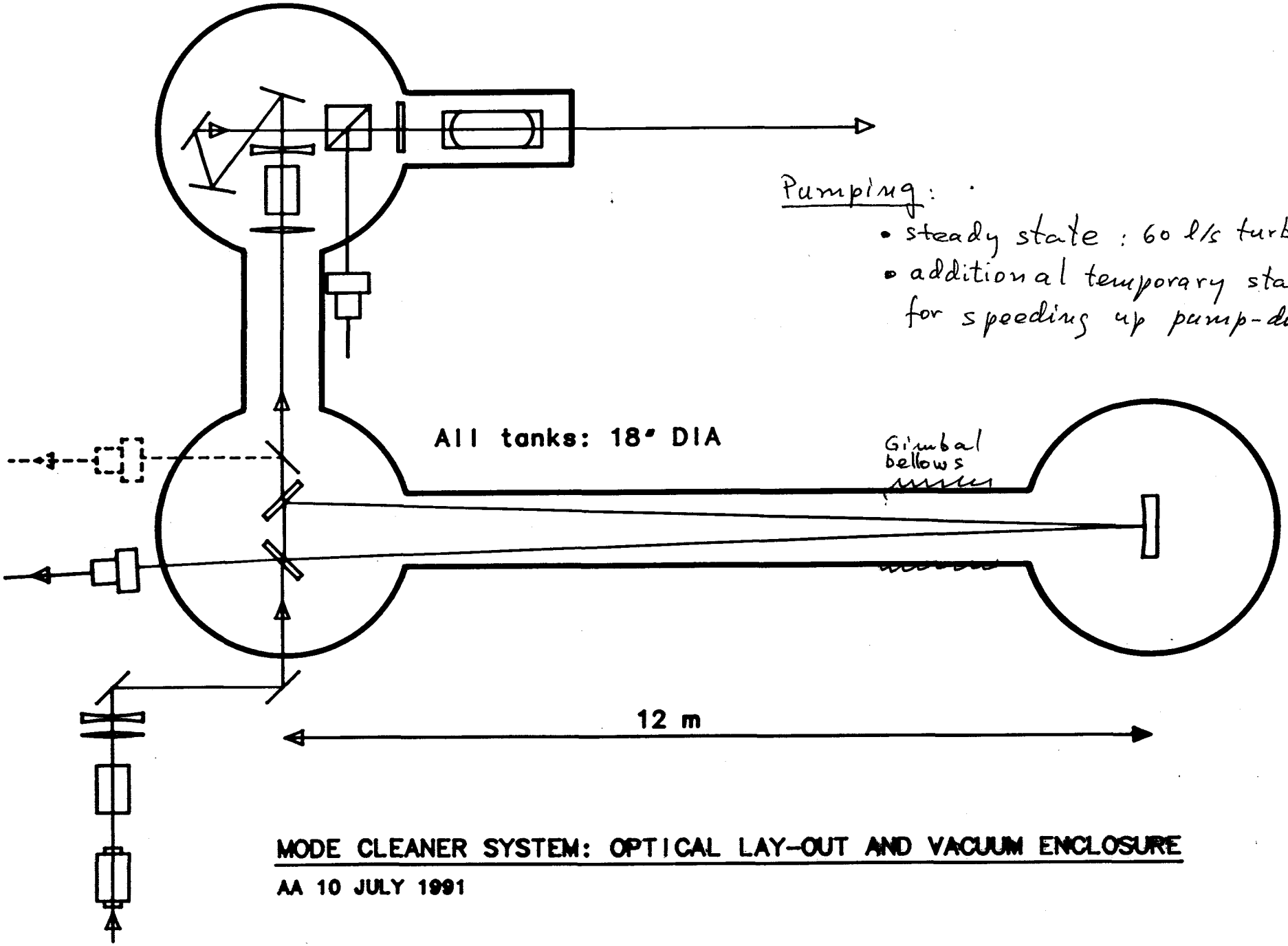
New Folder Name Long Mode Cleaner

Long Mode Cleaner: Objectives

1. Moving the RF Pockels cell ahead of the mode cleaner, testing the concept of passing the modulation sidebands through the mode cleaner **and** using the same modulation frequency for locking both the mode cleaner and the subsequent cavity or interferometer.
2. Testing LIGO-like suspension and control of test masses.
3. Development of a long mode cleaner to cover future needs of the 40 m prototype.
4. Development of the mode cleaner needed for the LIGO input optics.
5. Evaluation of effects related to removal of the Faraday isolator from the area between the mode cleaner and the interferometer:
   - Spurious interferometer effects
   - Backscattering of light

LIGO-T910013-00-R



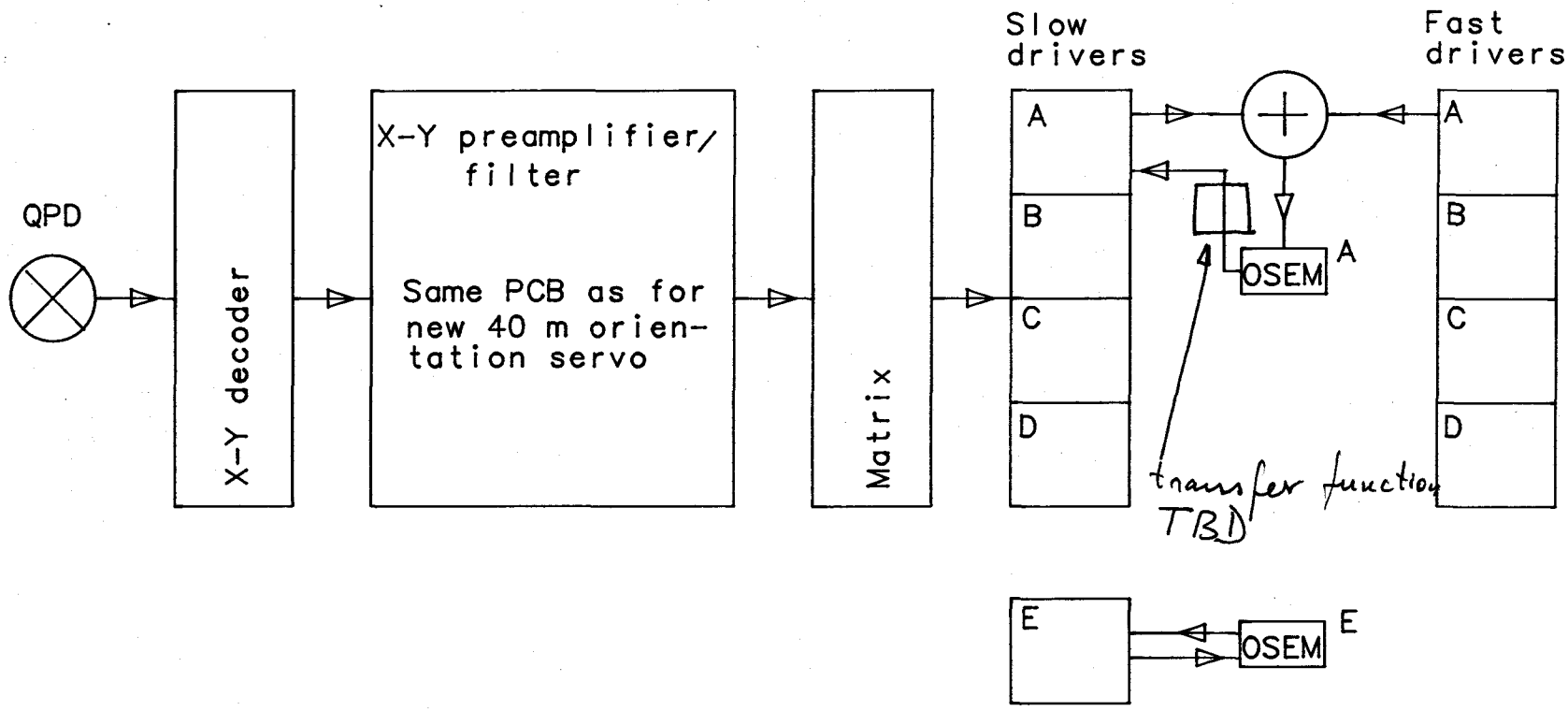
Pumping:

- steady state : 60 l/s turbo
- additional temporary station for speeding up pump-down

MODE CLEANER SYSTEM: OPTICAL LAY-OUT AND VACUUM ENCLOSURE

AA 10 JULY 1991

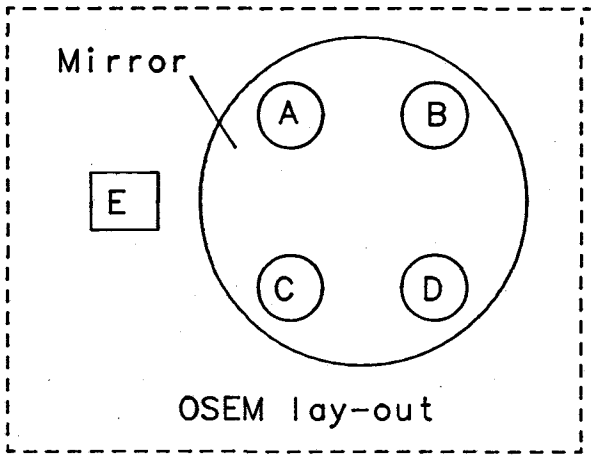
MIRROR CONTROL SYSTEM



TENTATIVE SPECS

Slow drivers: 100 mA (DC)
1 pA/sqrt(Hz), above 100 Hz

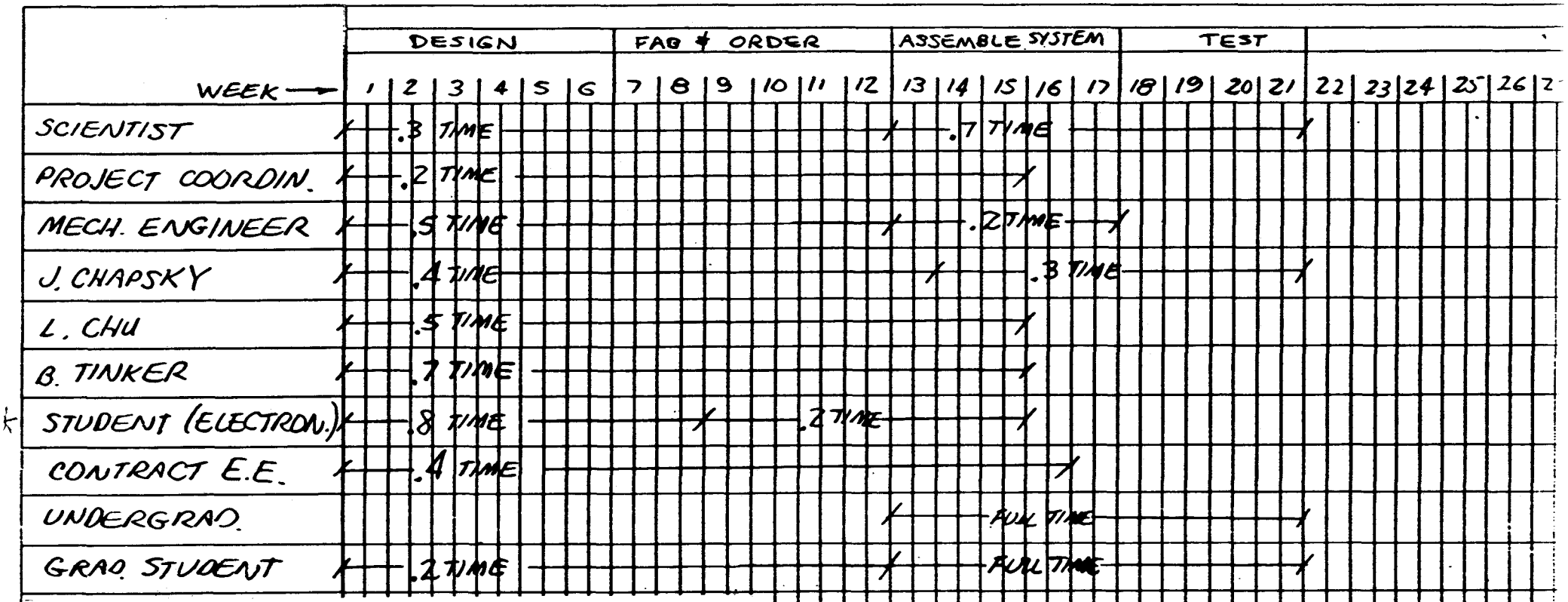
Fast drivers: 100 mA up to 1 kHz (Acquire mode)
1 pA/sqrt(Hz) at 1 mA, 100 Hz to 1 kHz (Run mode)



Frequency Servo:

Functional replica of 40 m prototype primary cavity servo

LONG MODE CLEANER PROGRAM



COSTS (k$)

A. VACUUM TANK INTERNALS	45.4
B. VACUUM SYSTEM	37.9
C. EXTERNAL OPTICS	30.6
D. ELECTRONICS	13.9
E. COATINGS	17.0
TOTAL	144.8

F: CONTRACT E.E. . . . . TBD

G. SUBSYSTEMS, MODULES FOR M.I.T. . . . TBD

PREPARED BY: L. JONES DATE: 7-11-91

APPROVED BY: DATE:

1 YEAR SCHEDULE

7947-5 MA

Experiments With Suspended Mirror Mode Cleaner — FJR 7/11/91

- Preconstruction evaluation of
  - — backscattering
  - — vibration isolation
- Construct SMMC
  - — shake down motion control and stabilization servos
  - — get "feel" of device
- Evaluate SMMC output beam characteristics:
  - — directional stability
  - — power stability
  - — RFAM with feedthrough modulation
- Verify that SMMC exhibits proper
  - — polarization filtering and stability
  - — suppression of input spatial mode fluctuations
  - — conversion of input spatial mode fluctuations to phase noise
- Couple light into rigid analyzer cavity
  - — measure output frequency noise (compare to rigid MC currently in use)
  - — modal analysis
  - — determine if there is observable benefit (with crude sensitivity) to feedthrough modulation
- Review $\longrightarrow$ 40-m? Further work in Optics Lab?