GEO 600 SUSPENSIONS. PROGRESS
8/98 → 2/99.

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CONSTRUCTION & TESTING OF MAIN-MIRROR TRIPLE PENDULUM SUSPENSION PROTOTYPE.

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KEY DESIGN ELEMENTS

ACTIVE ISOLATION STAGE (SEPARATE TEST)

PASSIVE SINGLE-LAYER STACK (RUBBER)

TRIPLE PENDULUM

- 2 STAGES WITH VERTICAL 'CANTILEVER' BLADE SPRING ISOLATION

MECHANICALLY SIMILAR 'REACTION PENDULUM' (DOES NOT NEED SEPARATE TESTING)

TEST RESULTS

1) LOCAL 'DAMPING' CONTROLLER (6 DOF AT UPPER MASS) WORKS AS MODEL ✓

2) LOWER CANTILEVER BLADE SPRING VERTICAL ISOLATOR

WORKS TO ~ 50 Hz (BUT NOT ABOVE) (ACCEPTABLE)

3) UPPER CANTILEVER BLADE SPRING VERTICAL ISOLATOR

WORKS TO ~ 25 Hz PROVIDES LITTLE OR NO ADDITIONAL ISOLATION AT HIGHER FREQUENCY

FACTOR ~ 4 PERFORMANCE LOSS AT 50 Hz

JUST ACCEPTABLE FOR GEO 600

ACTIVE SEISMIC ISOLATOR

a) MICROSEISMIC
   - CONTINUING SENSOR DEVELOPMENT

b) 0.5 Hz → 50 Hz BAND
   - INITIAL PROTOTYPES SATISFACTORY
   - MECHANICAL DESIGN FOR PRODUCTION PROTOTYPE ALMOST READY.

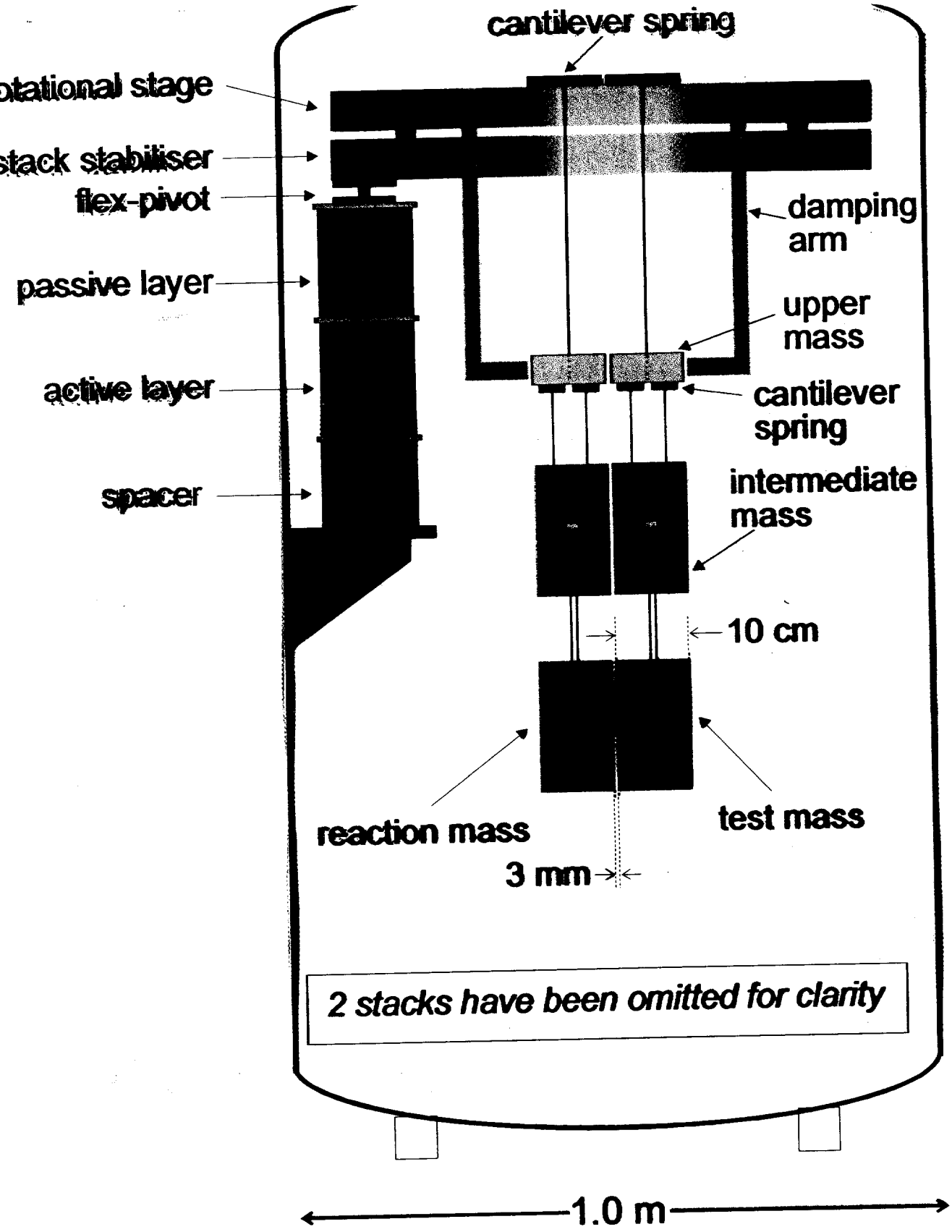
FUTURE WORK (6 MONTHS)

a) LOOK AT MODIFIED BLADE SPRING DESIGN (MAINLY FOR LSC)

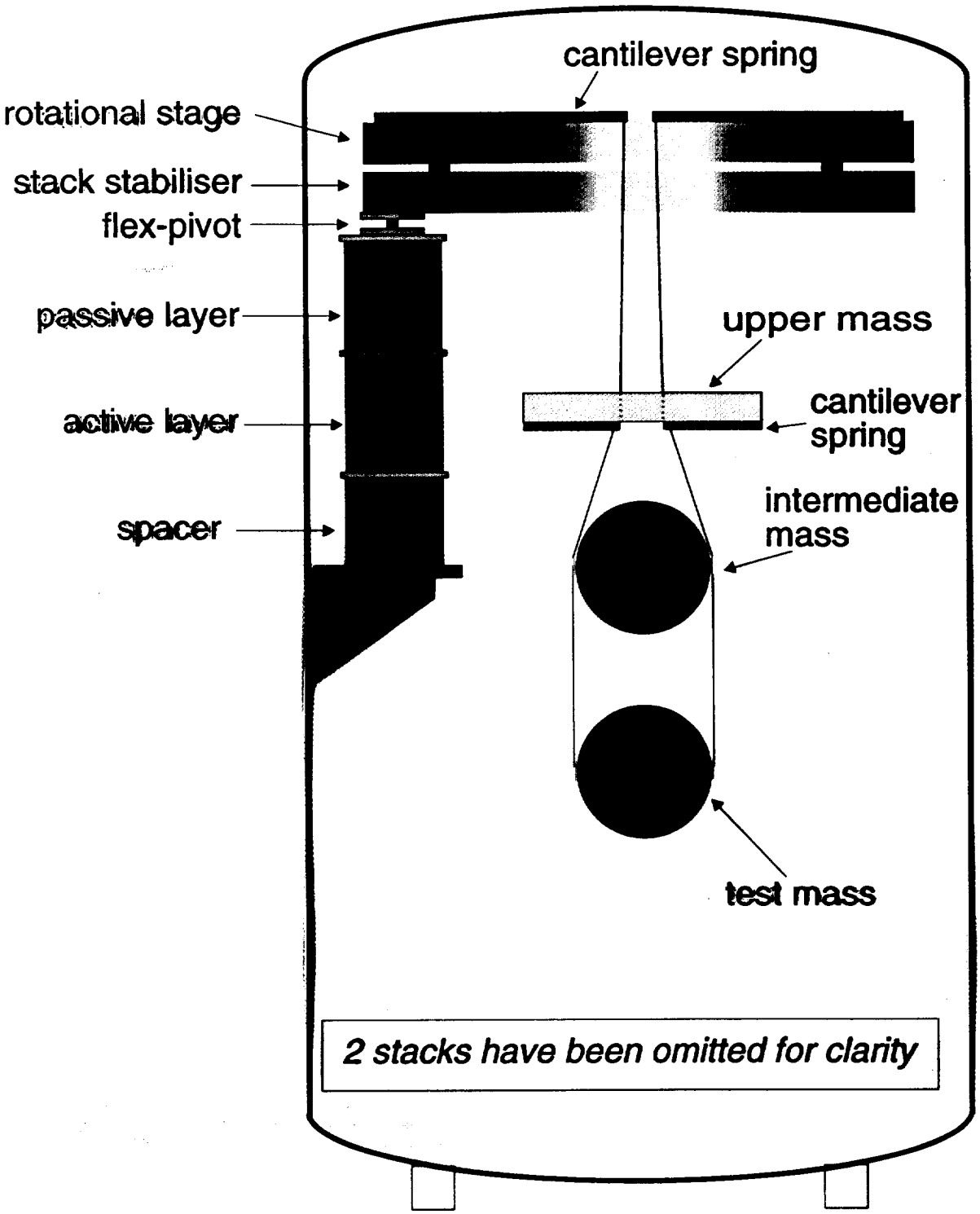
b) FURTHER STUDY OF ELECTROSTATIC ACTUATOR FOR LOWER STAGE (TEST MASS - REATION MASS)

c) FURTHER ASI DEVELOPMENT

d) CONSTRUCTION OF FIRST FEW SYSTEMS



Schematic of inboard test mass suspension (view perpendicular to optic axis)



Schematic of test mass suspension (view along optic axis)