FAX COVER PAGE

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DATE:	9/21/95
TIME:	9:00 am. pst.

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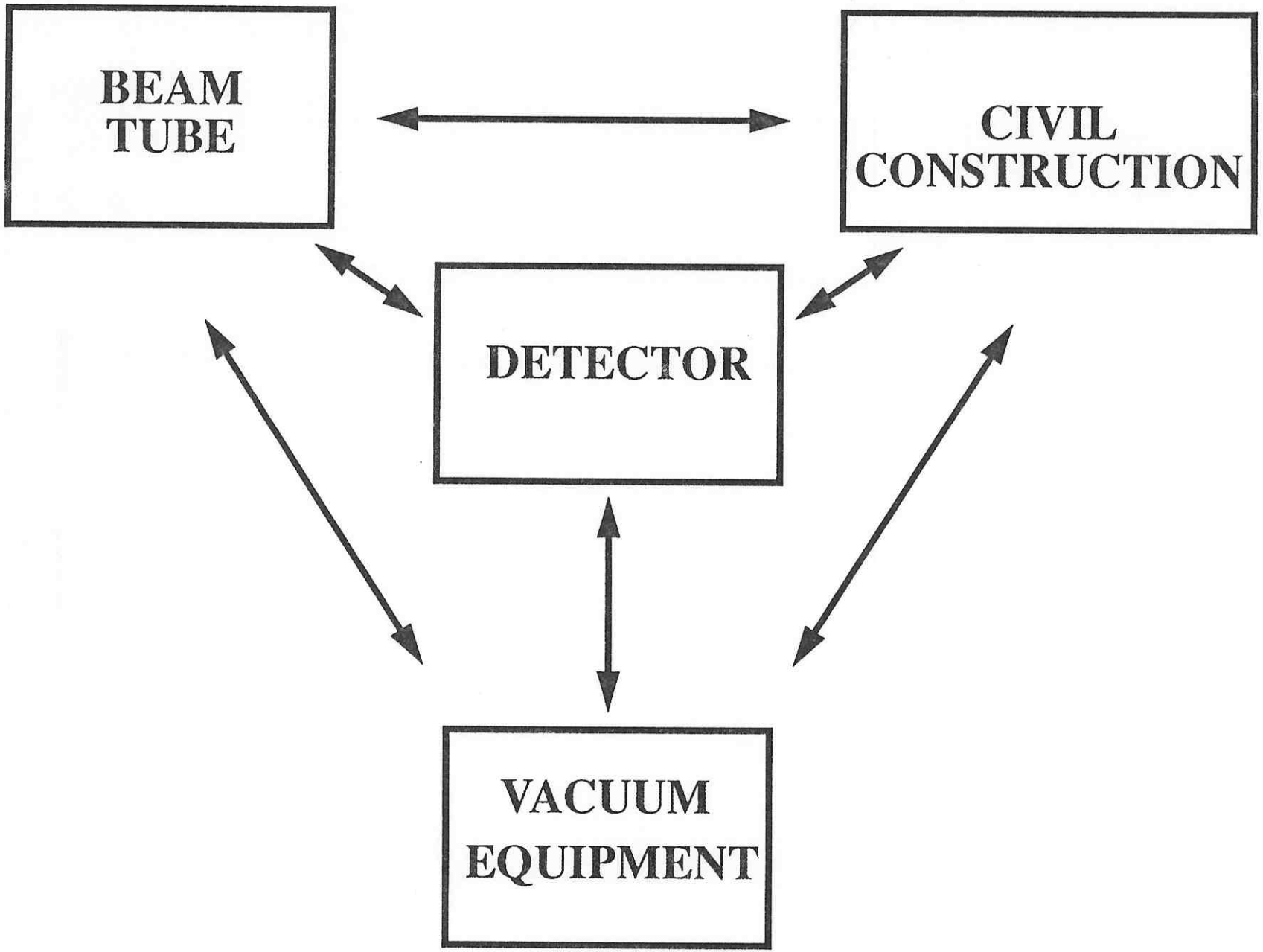
FAX NUMBER:	
VOICE NUMBER:	
REFER TO:	LIGO-L950065-00-M
SUBJECT:	INTERFACES

NUMBER OF PAGES FAXED INCLUDING THIS COVER SHEET:	



LIGO

INTERFACES

- A "link" in the implementation of two separate systems or subsystems:
  - physical
  - electrical
  - functional
  - signal
  - etc.
- If the two systems are under the control of a single design organization, then it is an "internal" interface (IICD)
- If the interface parameters have been set by an allocation at the system level, it is not a controlled interface, but rather a design requirement
  - e.g. Seismic attenuation of the SEI and seismic gain of the building
- If both systems are insensitive to changes in the interface parameters it is not a controlled interface
  - e.g. the electrical power load in each room is generally a design requirement, not a controlled interface requirement
- If a requirement is global, it is not an interface requirement
  - e.g. temperature control in the LVEA
- If a requirement can't be verified, it isn't written properly

INTERFACE DEFINITION PROCESS

- Regularly Scheduled Integration Meetings (now at 9:00 am Fri) are the Principal Forum for Interface & Requirements Identification & Resolution
  - ››Exclusion zones
  - ››Envelopes
  - ››Loads
  - ››Dimensions
  - ››Functional Requirements
  - ››Layouts
  - ››etc.
- Potential requirements are collected, discussed & dispositioned as either rejected or accepted as requirements or interface critical requirements

INTERFACE DEFINITION PROCESS (continued)

- The principal activity in support of this process has been the LVEA CAD layout to define:
  - ›› Electrical power routing/interfaces via conduit embedded in the slab
  - ›› Positioning of the LVEA building relative to the beam line (for aisle/work access)
  - ›› Definition of the pipe bridge for VE lines from the mechanical room to the vacuum line
  - ›› Layout/sizing of the cable raceways beneath the vacuum tubes and vacuum chambers
- Through this process we have ascertained that many of the items thought to be interface requirements by Parsons were found not to be interface requirements

Interface Control Document (ICD) Development

- PRIORITIES
  - Civil Construction (CC) ICDs have Priority Due to A&E Schedule
    - CC - BT ICD
    - CC - Detector ICD
    - CC - VE ICD
  - Next Priority is Completion of BT Interfaces since Design/Fabrication is Commencing
    - BT - VE ICD
    - BT - Detector ICD
  - Last Priority is the VE - Detector ICD since the Design Definition is Less Mature
- SCHEDULE
  - Final Complies with Parson's Requested Schedule
  - Behind Schedule for Draft Releases
  - Expect CC-x ICD Draft Releases by 1 Oct

INTERFACE CONTROL

- The release of an ICD is the start of the Interface Control Process
- An Interface Working Group (IWG) must be defined for each ICD with representation from each side of the interface
- Regularly scheduled meetings are held to address inevitable TBDs and proposed changes
  - ›› ECRs involving the ICDs are generally approved by the CCBs of all involved parties (e.g. CB&I for BT and PSI for VE and LIGO)
  - ›› LIGO Systems Engineering Chairs the IWGs

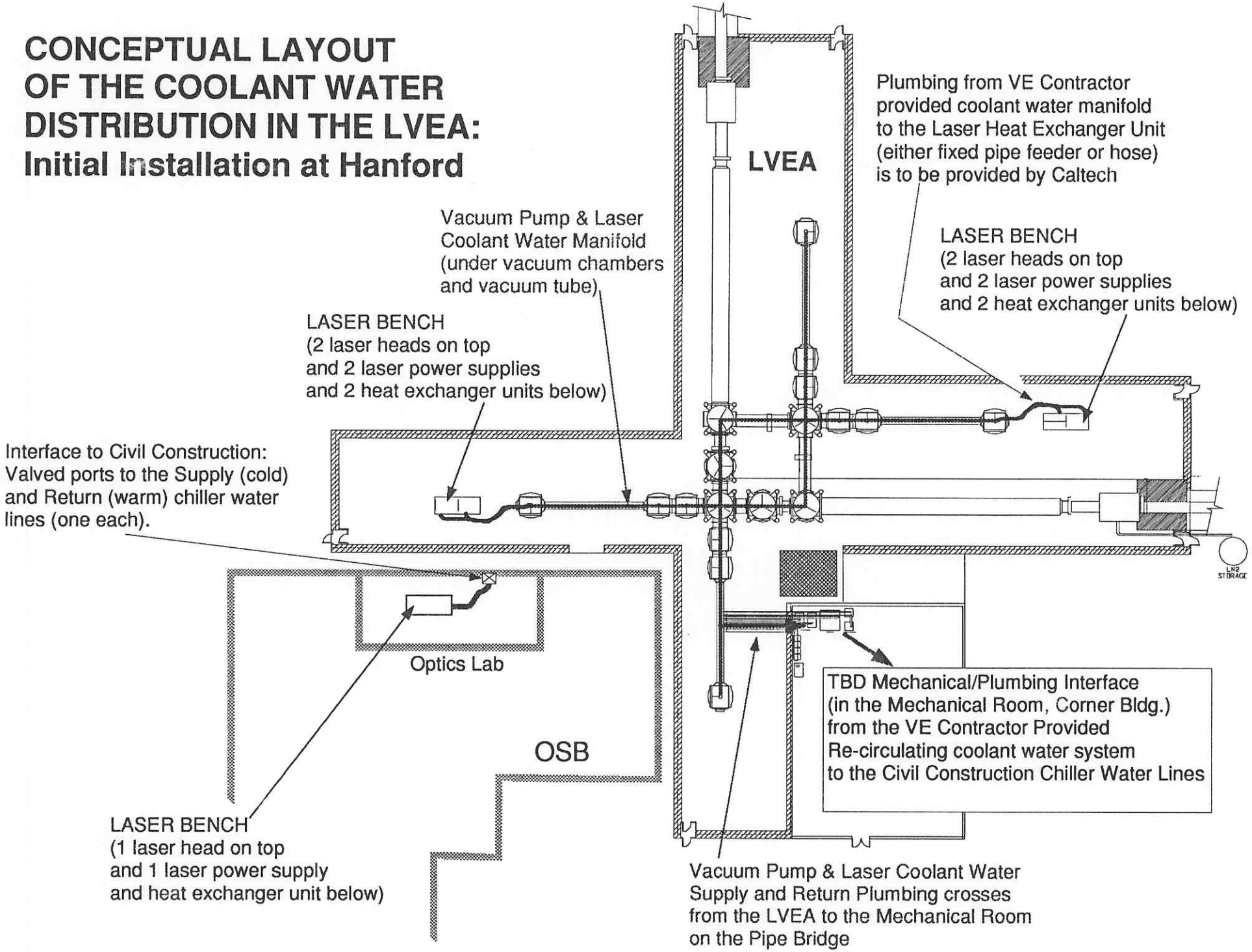
ISSUES

- Wind Loading
  - ››A potential problem -- little work to date
  - ››Resolution could affect the SEI-CC interface
- Grounding/Shielding
  - ››Unresolved need (and safety concerns) for Technical vs. Facilities ground approach proposed by Parsons
  - ››Will be incorporated into an overall EMI Control Plan
- Lightning
  - ››Unprotected BTE may be a problem
  - ››No cost effective method for protection yet identified
- Moisture Control for the BTE
  - ››Effective corrosion control may require (not baselined) de-humidification in the BTE

CIVIL CONSTRUCTION ICD STATUS

- Content and Assignments Determined and Discussed Internally and with Parsons
- Items Flagged by Parsons as Potential ICD Content have been Dispositioned:
  - General Requirement
  - Interface Requirement
  - Reference Data
- CC - VE
  - ›› Issues (Impact to 100% Conceptual Design):
    - VE Equipment Space in Vertex Building Mechanical Room
    - Piping Bridge from Mechanical Room to LVEA
  - ›› Pending Resolution:
    - LVEA Layout Envelope for VE (In process)
    - Wall Feed-Throughs for Piping & Bridge Interface with VE Equipment for Exhaust, Vent & Purge in the LVEA (In process)
    - Cryo tank and piping interfaces at the LVEA, mid- and end-stations (VE Contractor Task)

CONCEPTUAL LAYOUT OF THE COOLANT WATER DISTRIBUTION IN THE LVEA: Initial Installation at Hanford

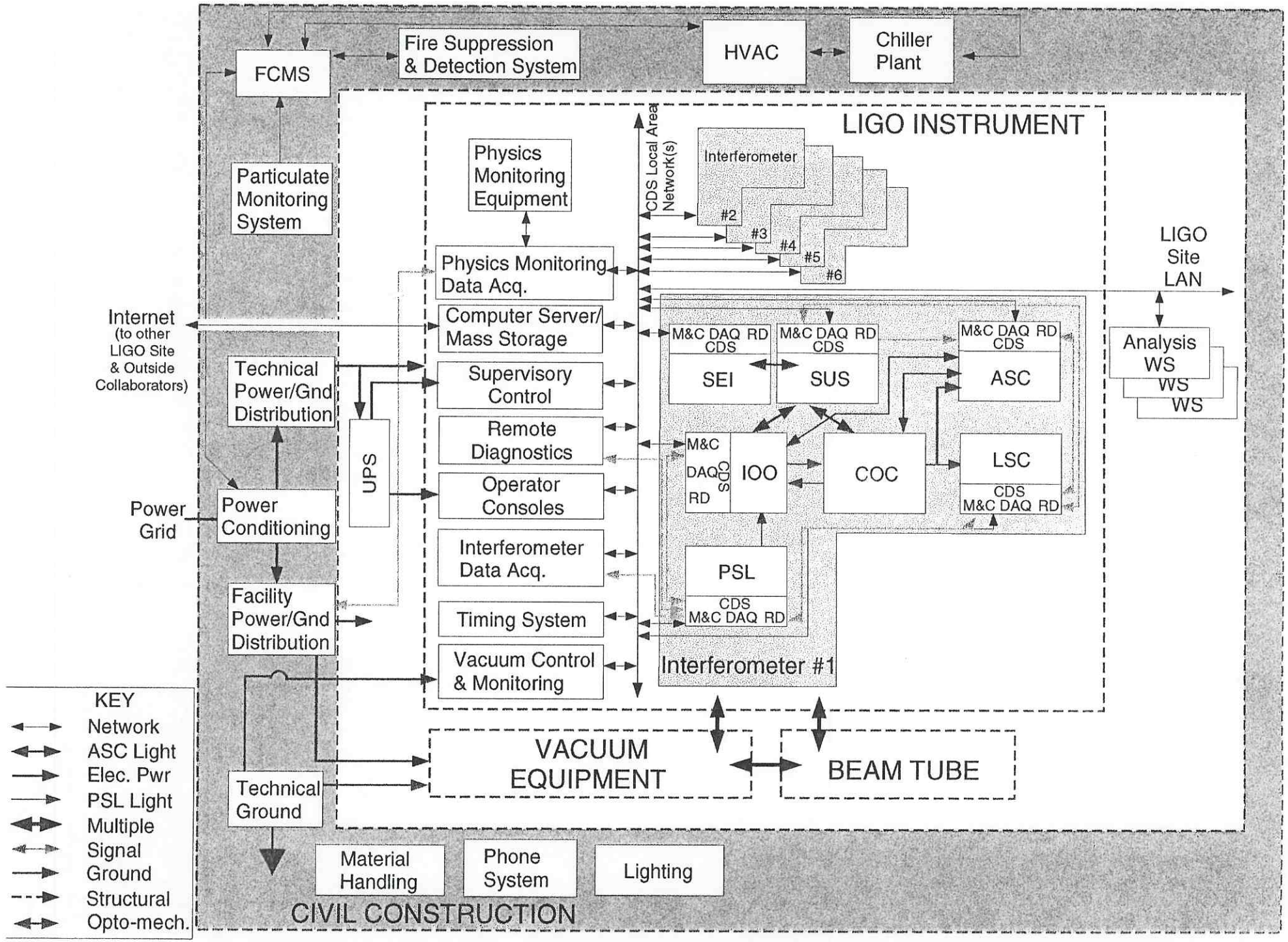


CIVIL CONSTRUCTION ICD STATUS (continued)

- CC - BT
  - Definition of Anchor Fixture Loads on the Termination Slab are TBD (but not expected to be an issue)
  - Moments (due to eccentric loading) at the interface of the fixed support to the BTE foundation slab exceed slab strength for a uniform 4 in. thick slab
    - Currently loads are defined for the load application point on the CB&I support structure, not at the interface
    - Parsons is looking at local slab reinforcement
    - Increased CB&I fixed support structure base dimension may be a more cost effective design
    - Uncertain whether the bolt embedment depth in the CB&I design is adequate
  - Tube interface with the building walls (LVEA, mid- and end-stations) is TBD

CIVIL CONSTRUCTION ICD STATUS (continued)

- CC - DETECTOR
  - ›› Most requirements appear to be driven by CDS needs and operational considerations
  - ›› There are not many interface requirements:
    - Power distribution in the LVEA to the vacuum manifold area
    - Stay clear areas for CDS rack placement and cable trays
    - Stay clear envelopes for SEI support columns
    - Coolant interface with the chilled water system in the optics lab of the OSB (coolant interface in the LVEA will be with the VE coolant manifold)



DETECTOR - CIVIL CONSTRUCTION FUNCTIONAL BLOCK DIAGRAM