Signal Feedthrough
Progress Report

ATLAS LAr Week
26 Jan 98

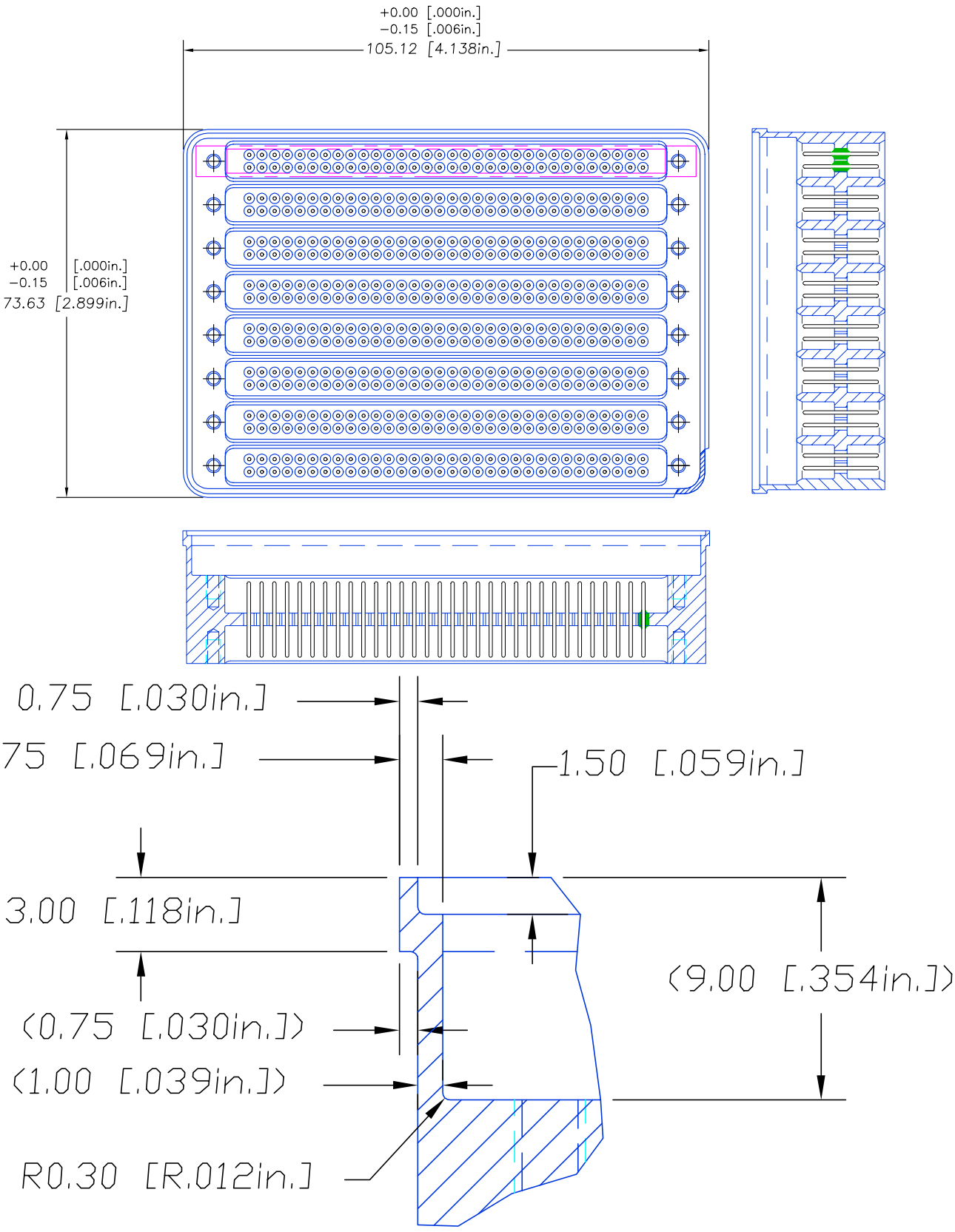
- Pin Carrier Order
- Plans for Prototypes
- Endcap Integration Issues
- Schedule and Management Issues

Michel Lefebvre
University of Victoria
British Columbia, Canada

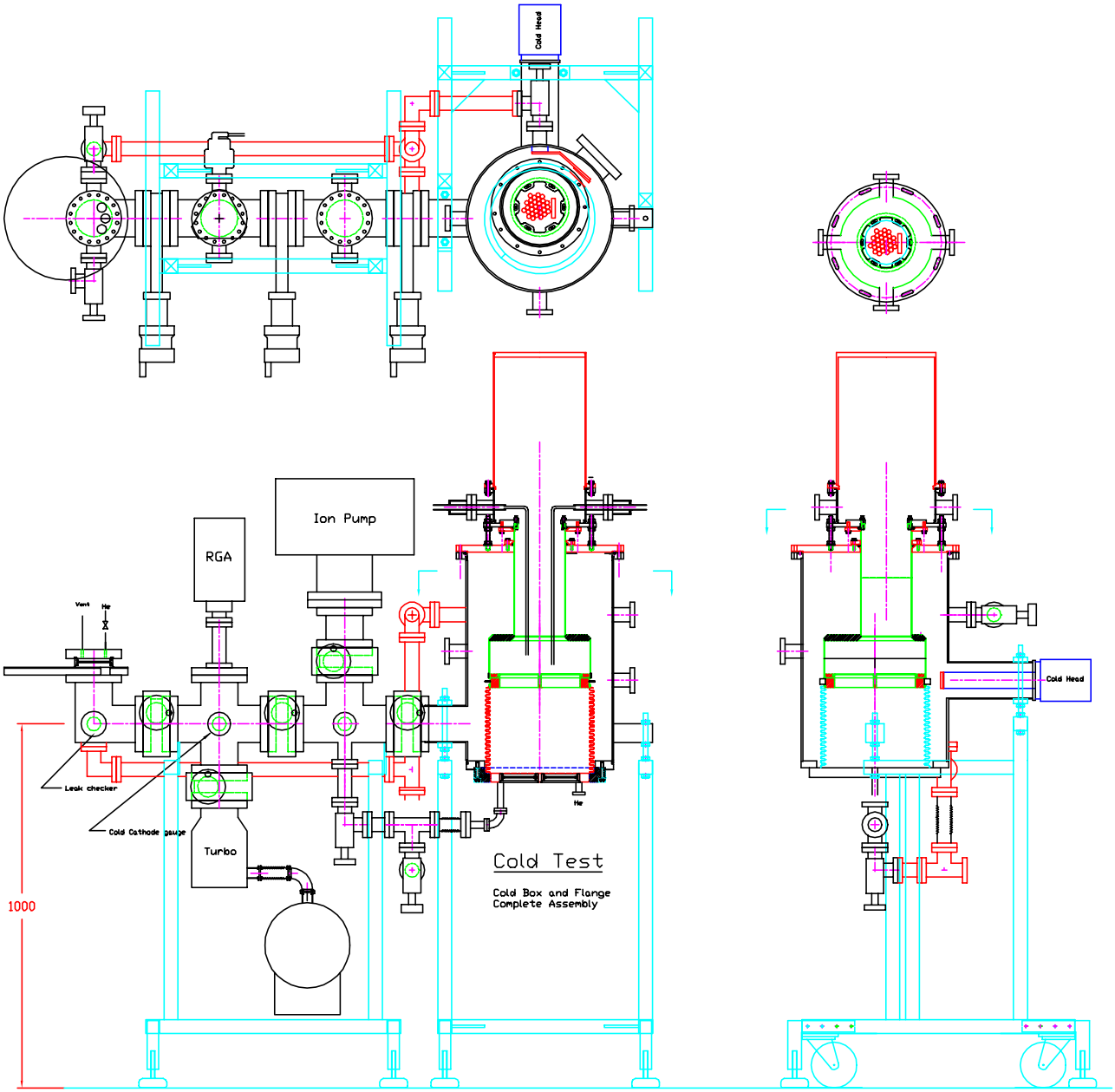
Pin Carrier Order and Plans for Prototypes

- Pin carrier order placed second week of January 1998.
- Delivery 14-16 weeks.
- Total Order:
    - Glasseal
        - 20 pin carriers BNL
        - 20 pin carriers Victoria
    - Pacific Coast Technology
        - 10 pin carriers BNL
        - 10 pin carriers Victoria
- BNL and Victoria plan to produce 2 feedthrough units each

Pin Carrier Design

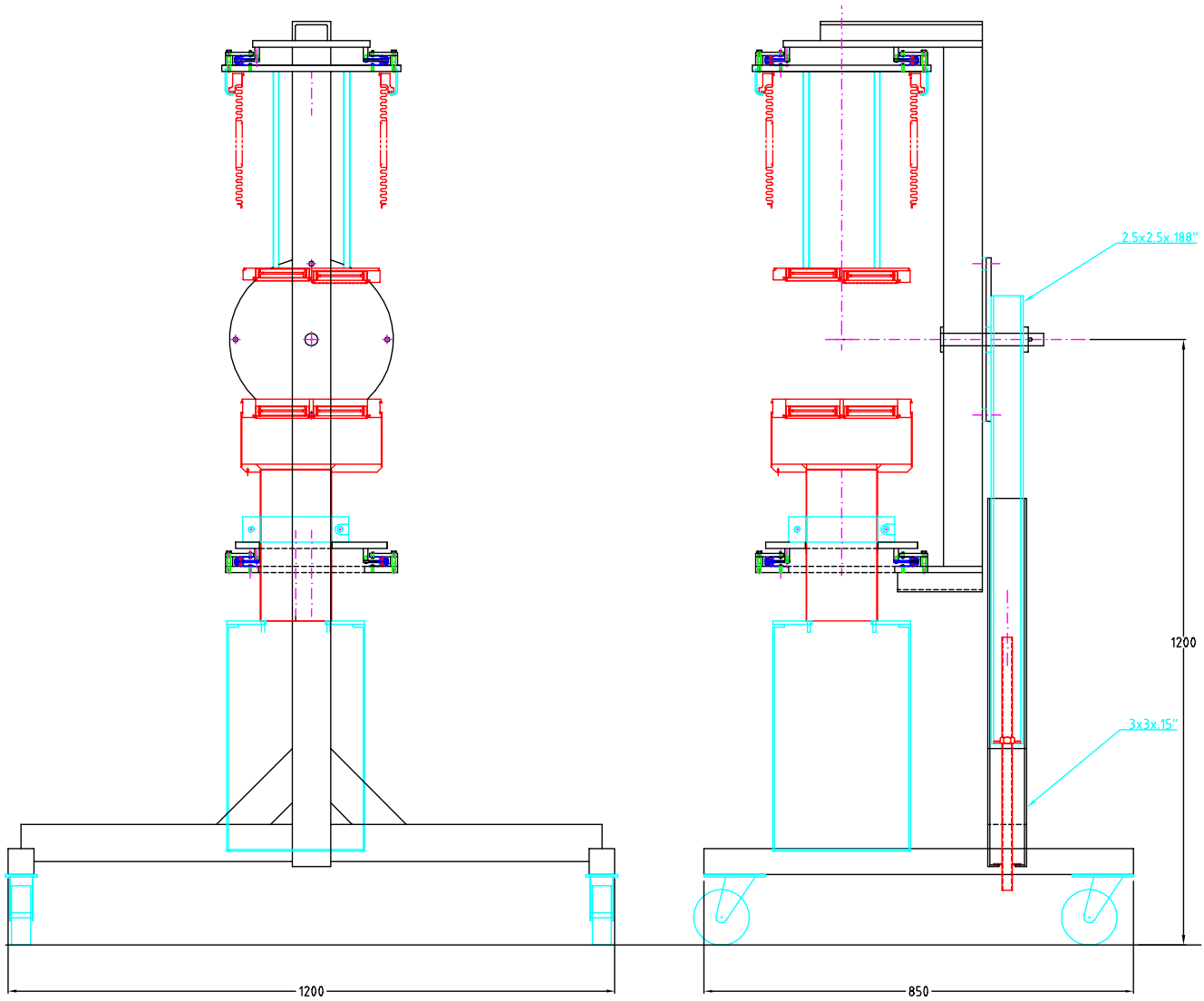


Leak Test Setup in Victoria



- Leak detection using He leak detector supported by an RGA
- Leak detector services warm and cold test stations
- Cooling by cryo-cooler or LN_2
- Parts ordered and received: He leak detector operational
- Warm side assembled; starting vacuum tests

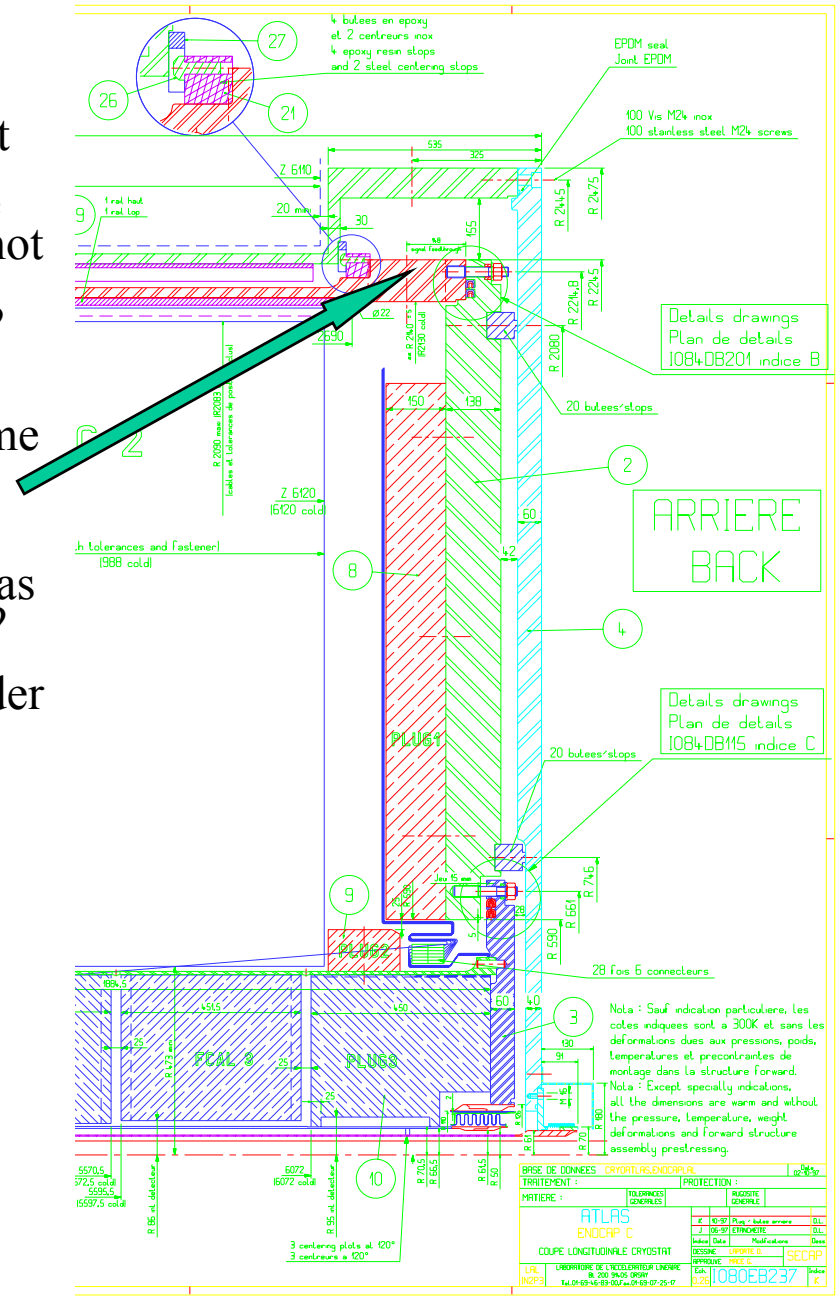
Assembly Jig in Victoria



- Rotation about horizontal and vertical axis possible
- Various assembly scenarios under study
- Parts ordered

Endcap Integration Issues

- Feedthrough assembly skirt
  - following radial space increase, the skirt will not cover all the bellows anymore. Extend skirt?
- Bi-metallic junction and hence diameter of funnel same as for barrel?
- Details of the bolt flange region to be verified. Same as for barrel module 0 cryostat?
- Final length of bellows under discussion
  - Visit to the bellows company scheduled for 12th Feb 1998



Endcap Signal Feedthrough Project
Canadian Responsibilities

- Design
- Fabrication
    - Pigtails purchased from Orsay
- Commissioning
- Transport
- Assistance during installation:
    - Assistance during welding on the cryostat
    - Assistance for leak testing during installation
    - DC Electrical tests during the installation

- Grey areas which require more discussion:
    - Heater power distribution
    - Flange temperature monitoring
    - Connection to vacuum manifolds

Endcap Signal Feedthrough Team

Paul Birney	Senior Technician, TRIUMF Leak test station Assembly tooling
Margret Fincke	Research Associate, Victoria Electric test station Vacuum cable development
Terry Hodges	Chief Engineer, TRIUMF Feedthrough unit design Finite element analysis
Alisa Humphrey	Junior Technician, Victoria Temperature Cycling Unit
Richard Keeler	Faculty, Victoria Test stations Vacuum cable development
Roy Langstaff	Senior Draftsman, TRIUMF Feedthrough unit design Procurement issues
Michel Lefebvre	Faculty, Victoria Project leader
Mark Lenckowski	Draftsman, TRIUMF
Ernie Neuheimer	Research Scientist, CRPP Carleton Vacuum cable development

On a consultant basis:

Paul Poffenberger	Research Associate, Victoria Leak test station Vacuum system
Randy Sobie	Faculty, Victoria DAQ

Endcap Signal Feedthrough Project

Top PBS Levels

PBS	Task	WBS	Description
4		1	Endcap Signal Feedthrough Project
4.1		2	Project Setup
4.1.1		3	Leak Test Setup
4.1.2		3	Electric Test Setup
4.1.3		3	Data Acquisition System
4.1.4		3	FT Assembly Tools
4.1.5		3	FT Prototypes
4.1.6		3	Management Tools
4.2		2	FT Series Assemblies
4.2	D	3	Design
4.2	AO	3	Assembly for ECC
4.2	T	3	Testing and Commissioning for ECC
4.2	A	3	Installation on ECC
4.2	AO	3	Assembly for ECA
4.2	T	3	Testing and Commissioning for ECA
4.2	A	3	Installation on ECA
4.2	RE	3	Repairs
4.2.1		3	Mechanical Components
4.2.1.1		4	Pin Carriers
4.2.1.2		4	Warm Flanges
4.2.1.3		4	Cold Flanges
4.2.1.4		4	Bellow Assemblies
4.2.1.5		4	Bolt Flanges
4.2.1.6		4	Funnel Assemblies
4.2.2		3	Electrical Components
4.2.2.1		4	Pig Tail Cables
4.2.2.2		4	Vacuum Cables
4.2.2.3		4	Heaters
4.2.3		3	Shipping Crates

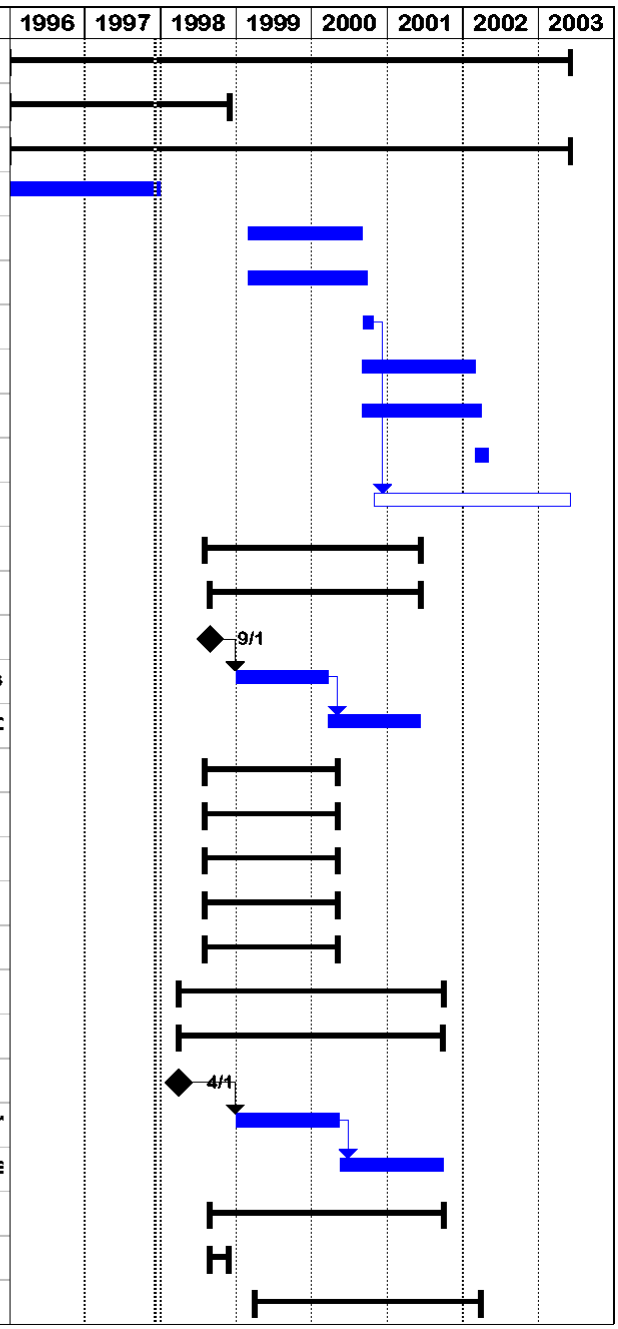
4.n for ATLAS Canada corresponds to

4.2.2.1.n in the TDR

Endcap Signal Feedthrough Project

Series Assemblies Details

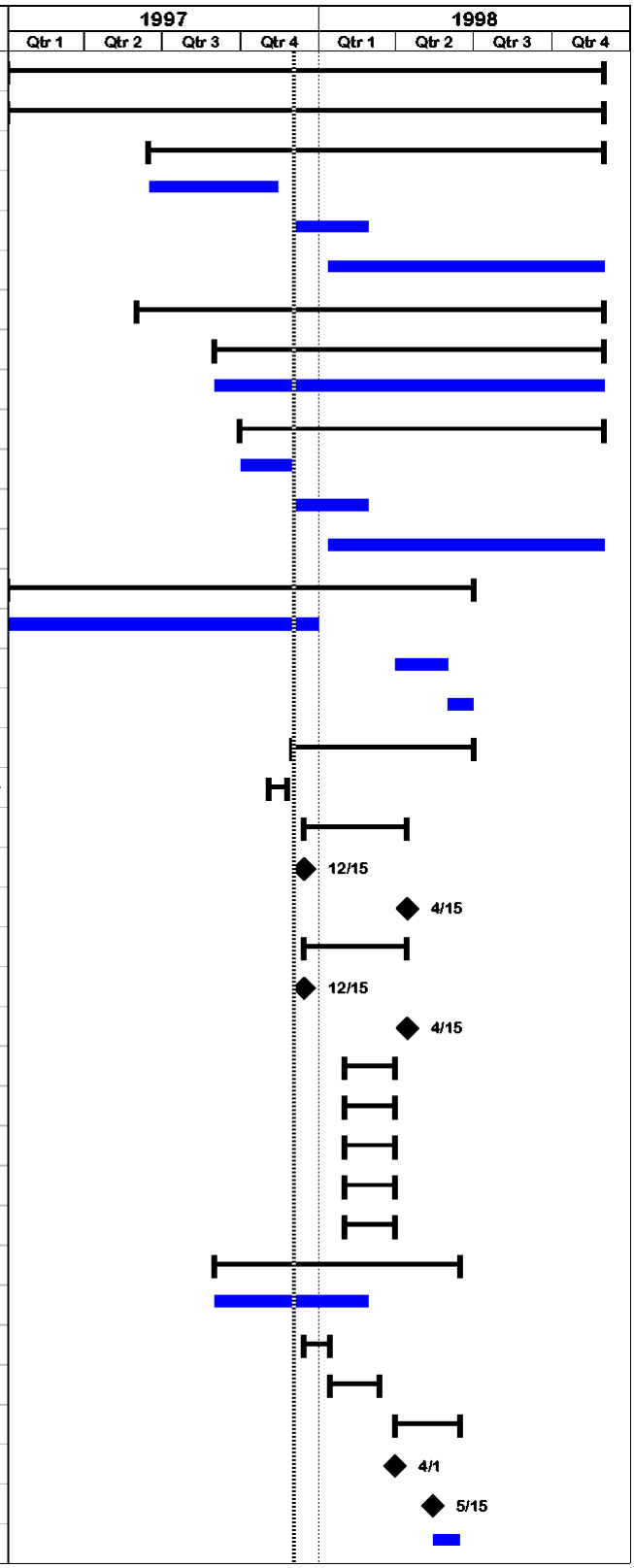
PBS	Task	WBS	Description
4		1	Endcap Signal Feedthrough Project
4.1		2	Project Setup
4.2		2	FT Series Assemblies
4.2	D	3	Design
4.2	AO	3	Assembly for ECC
4.2	T	3	Testing and Commissioning for ECC
4.2	A	3	Installation on ECC
4.2	AO	3	Assembly for ECA
4.2	T	3	Testing and Commissioning for ECA
4.2	A	3	Installation on ECA
4.2	RE	3	Repairs
4.2.1		3	Mechanical Components
4.2.1.1		4	Pin Carriers
4.2.1.1	CO	5	Ordering
4.2.1.1	CR	5	Reception 30 / 2 months (firs
4.2.1.1	CR	5	Reception 30 / 2 months (sec
4.2.1.2		4	Warm Flanges
4.2.1.3		4	Cold Flanges
4.2.1.4		4	Bellow Assemblies
4.2.1.5		4	Bolt Flanges
4.2.1.6		4	Funnel Assemblies
4.2.2		3	Electrical Components
4.2.2.1		4	Pig Tail Cables
4.2.2.1	CO	5	Ordering
4.2.2.1	CR	5	Reception 100 / 2 months (fir
4.2.2.1	CR	5	Reception 100 / 2 months (se
4.2.2.2		4	Vacuum Cables
4.2.2.3		4	Heaters
4.2.3		3	Shipping Crates



Endcap Signal Feedthrough Project

Project Setup Details

PBS	Task	WBS	Description
4		1	Endcap Signal Feedthrough Project
4.1		2	Project Setup
4.1.1		3	Leak Test Setup
4.1.1	D	4	Design
4.1.1	A	4	Assembly
4.1.1	T	4	Testing and Commissioning
4.1.2		3	Electric Test Setup
4.1.3		3	Data Acquisition System
4.1.3	T	4	Testing and Commissioning
4.1.4		3	FT Assembly Tools
4.1.4	D	4	Design
4.1.4	A	4	Assembly
4.1.4	T	4	Testing and Commissioning
4.1.5		3	FT Prototypes
4.1.5	D	4	Design
4.1.5	A	4	Assembly
4.1.5	T	4	Testing
4.1.5.1		4	Model FT
4.1.5.2		4	Weld Test Flanges and Pin Carriers
4.1.5.3		4	Glass Pin Carriers
4.1.5.3	CO	5	Ordering
4.1.5.3	CR	5	Reception
4.1.5.4		4	Ceramic Pin Carriers
4.1.5.4	CO	5	Ordering
4.1.5.4	CR	5	Reception
4.1.5.5		4	Warm Flanges
4.1.5.6		4	Cold Flanges
4.1.5.6		4	Bellows Assemblies
4.1.5.7		4	Bolt Flanges
4.1.5.8		4	Funnel Assemblies
4.1.5.9		4	Vacuum Cables
4.1.5.9	D	5	Design
4.1.5.9.1		5	Strip Assembly Prototypes
4.1.5.9.2		5	Connector Prototypes
4.1.5.9.3		5	Complete Assembly Prototypes
4.1.5.9.3	CO	6	Ordering
4.1.5.9.3	CR	6	Reception
4.1.5.9.3	T	6	Tests



Signal Feedthrough Notes

Editors are being assigned for the following notes:

- **ATLAS LAr Calorimeter Signal Feedthrough:**
  - **Design**
  - **Assembly**
  - **Vacuum Cables**
  - **Pigtail Cables**
  - **Pin Carriers**
  - **Testing**
  - **Installation**
  - **QA and QC**

Endcap Signal Feedthrough Low Voltage Vacuum Cables

Current and Temperature Issues

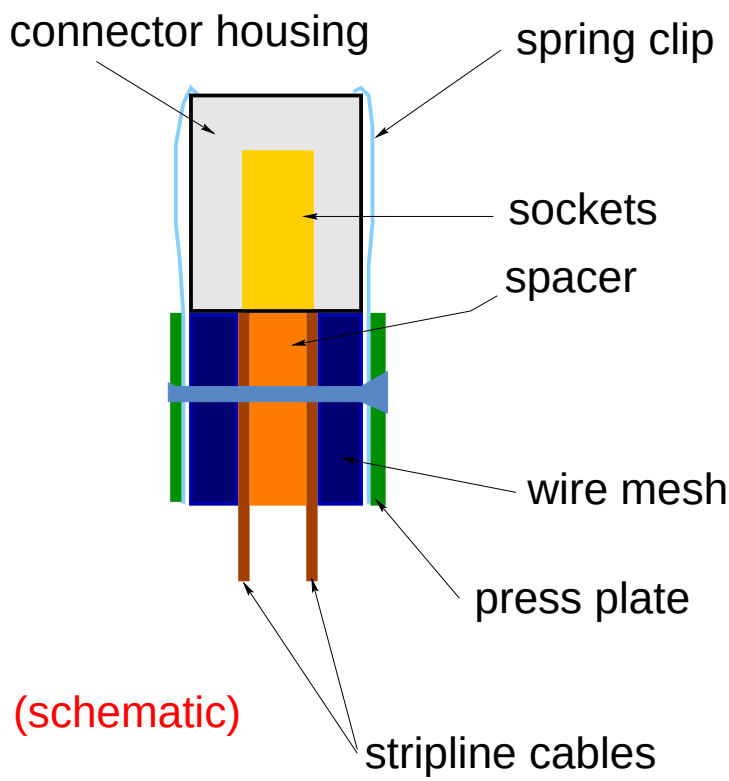
ATLAS LAr Week
26 Jan 98

Terry Hodges
TRIUMF and University of Victoria
British Columbia, Canada

Vacuum Cable Development in Canada
Signal Cables

- All-Flex design: rigid part of the connector is no longer an integral part of the microstrip cable
- Aim at simpler and cheaper design
- Design work:
  - E. Neuheimer (CRPP Carleton)
  - G. Hoeppel (Strataflex, Toronto)
- We visited Strataflex 24 Nov 97
- Order of prototype signal strip lines placed in Dec 97
- Two connector designs will be tried:
  - wire mesh (BNL/CRPP design)
  - plated plastic (Strataflex proposition)
- Expect first complete cable prototypes mid February 98

ALL-FLEX cable connector design



Vacuum Cable Development in Canada

HEC Low Voltage Cables

- HEC requires special vacuum cables for the low voltage
- Our current understanding:
    - one HEC feedthrough unit per quadrant
    - 8 modules per quadrant
    - 5 motherboards per module
    - 6 lines (3 LV and their returns) per mother boards
    - Total of 240 lines per quadrant for a total of 15 different current supplies
    - 6 X 64 = 384 pins are reserved per feedthrough unit
- Our baseline design uses 70µm ground and signal traces
- Propose a scenario where the striplines would always operate below 330K, even if one of the parallel traces for any of the heavier current supplies was broken:
    - Instead of 16 x (15 x 1) = 240
    - Propose 16 x (11 x 1 + 1 x 2 + 3 x 3) = 352