

# Signal Feedthrough Progress Report

ATLAS LAr Week  
9th July 98

- General Status
- FEA Update
- Project Schedule
- Low Voltage Cables
  - Cable development update
  - FEA update

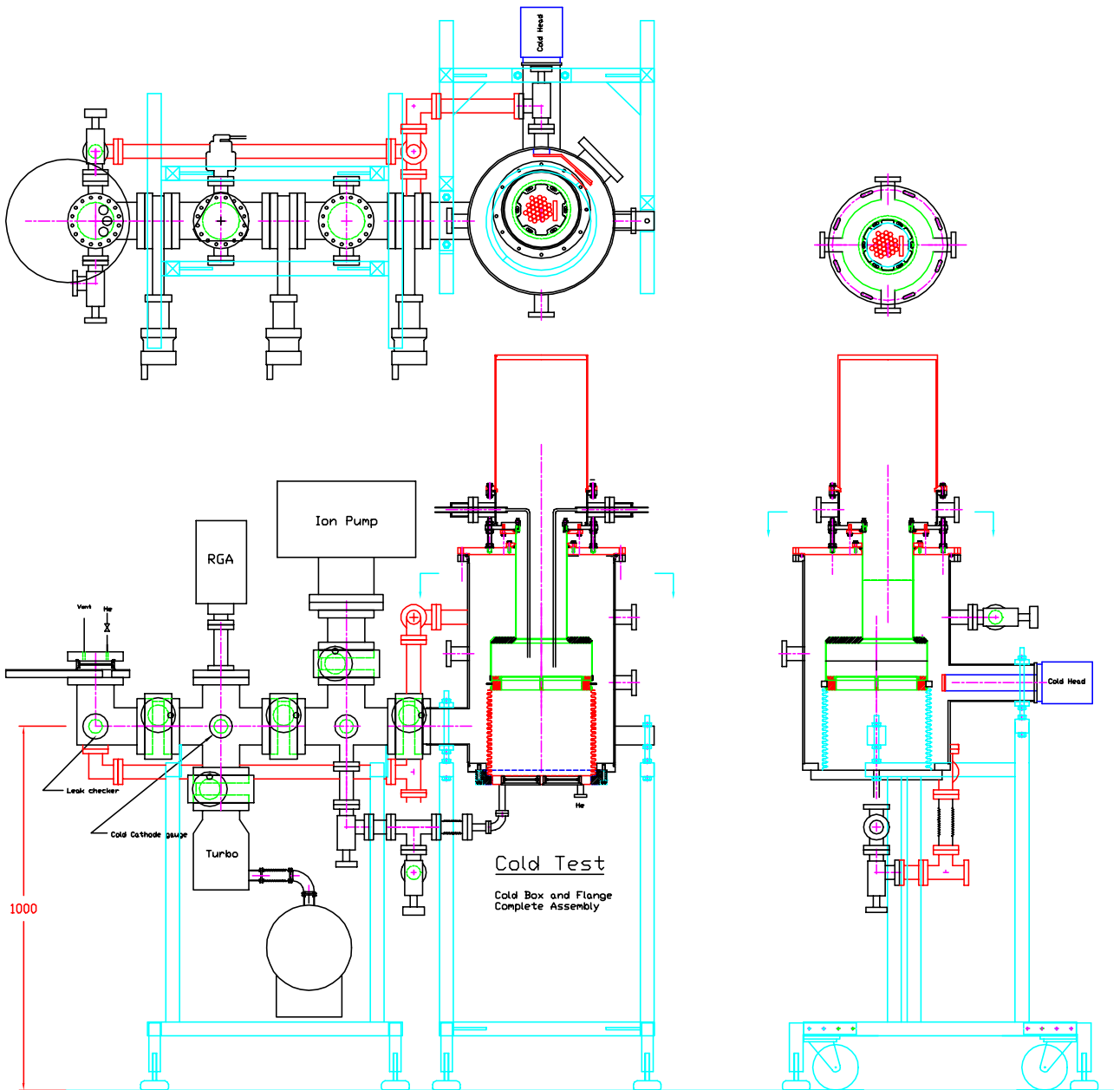


Presented by Terry Hodges  
TRIUMF and University of Victoria  
British Columbia, Canada

# Pin Carrier Order for Prototypes

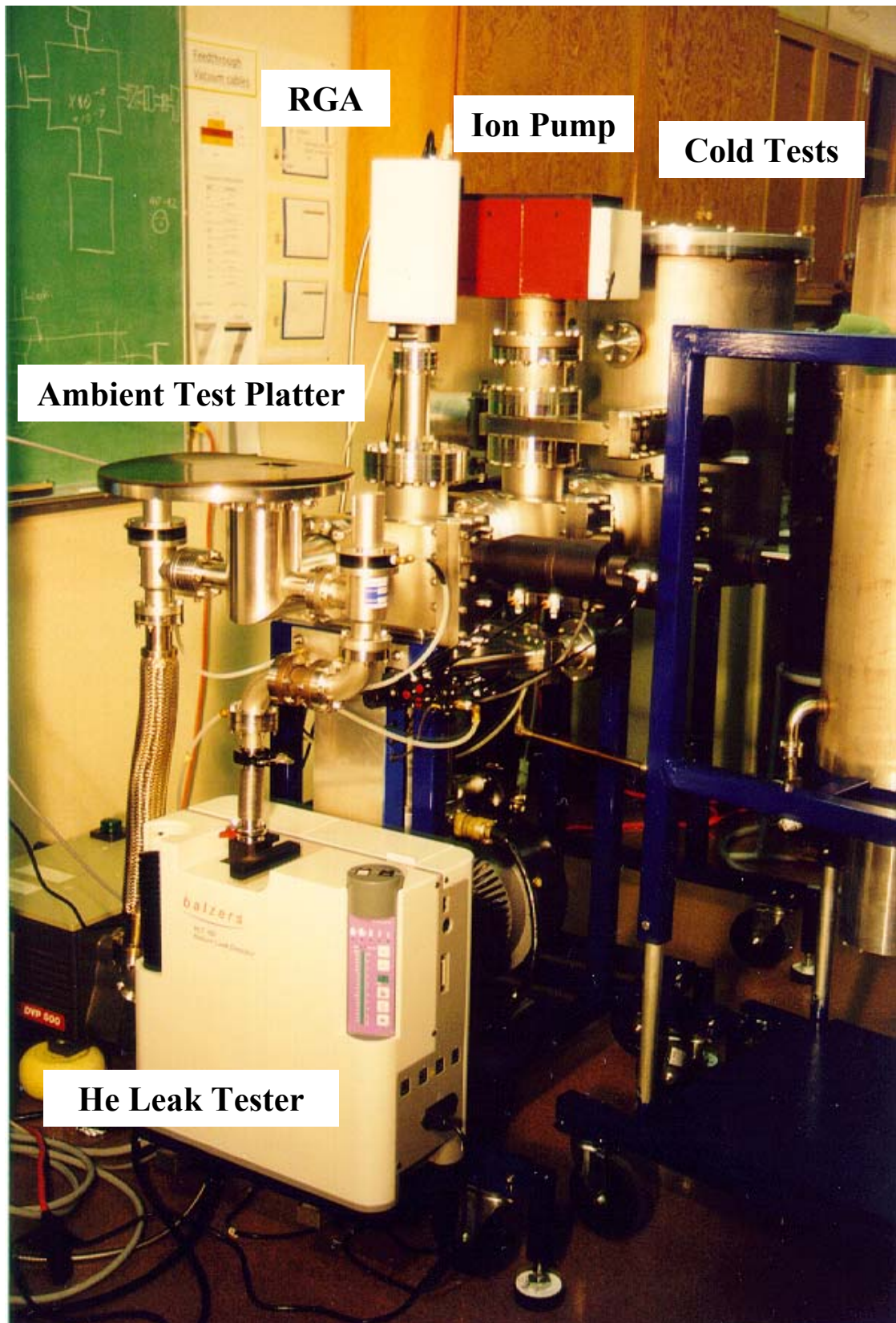
- BNL and Victoria plan to produce 2 feedthrough units each
- Total Order:
  - Glasseal
    - Start of reception expected mid July 98
    - 20 pin carriers BNL
    - 20 pin carriers Victoria
    - These will be gold-plated
  - Pacific Coast Technologies
    - Start of reception expected late July 98
    - 10 pin carriers BNL
    - 10 pin carriers Victoria
    - These will NOT be gold-plated
- Costs
  - Glasseal
    - 448 pins: US\$ 1455 each for 20 + US\$ 40 for Au
    - 512 pins: US\$ 1621 each for 20 + US\$ 47 for Au
    - 448 pins: US\$ 593 each for 500
    - 512 pins: US\$ 659 each for 500
  - PCT
    - 448 pins: US\$ 3872 each for 10 + US\$ 1400 for Au
    - 512 pins: US\$ 3961 each for 10 + US\$ 1400 for Au
    - 448 pins: US\$ 1997 each for 500 + US\$ 200 for Au
    - 512 pins: US\$ 2027 each for 500 + US\$ 200 for Au

# Leak Test Setup in Victoria



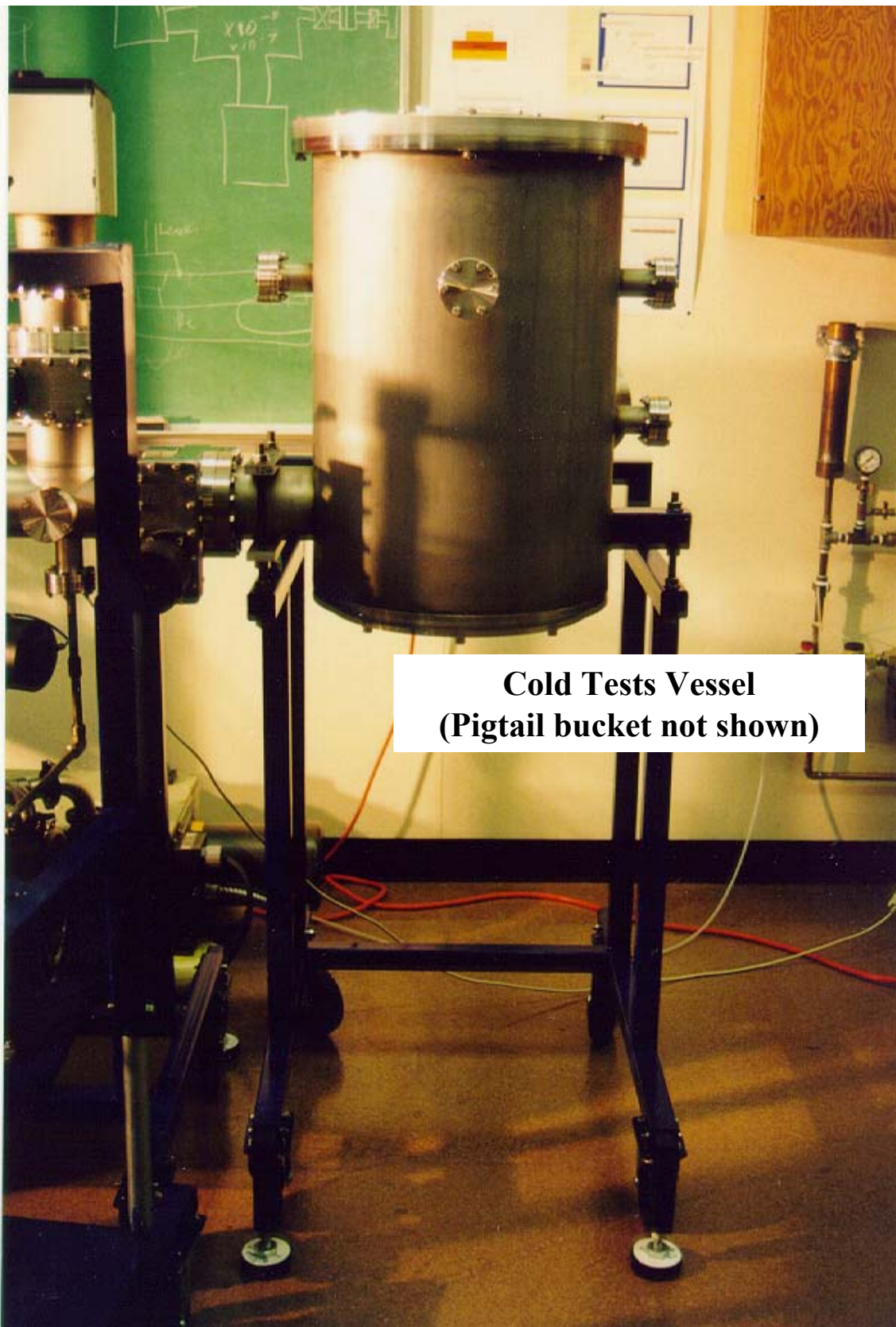
- Leak detection using He leak detector supported by an RGA
- Leak detector services warm and cold test stations
- Cooling by cryo-cooler or LN<sub>2</sub>
- All assembled, commissioning started

# Leak Test Setup in Victoria



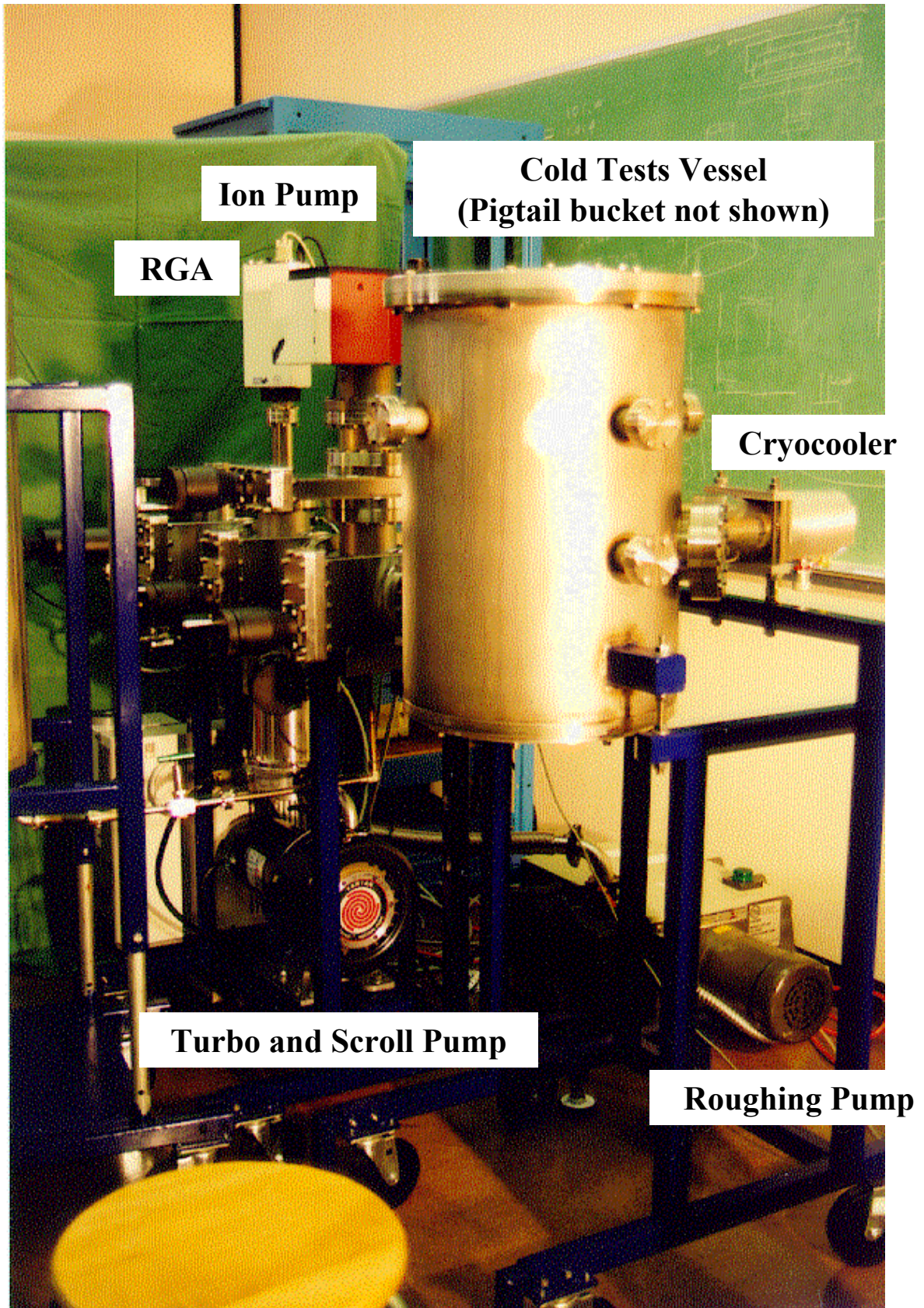


# Leak Test Setup in Victoria



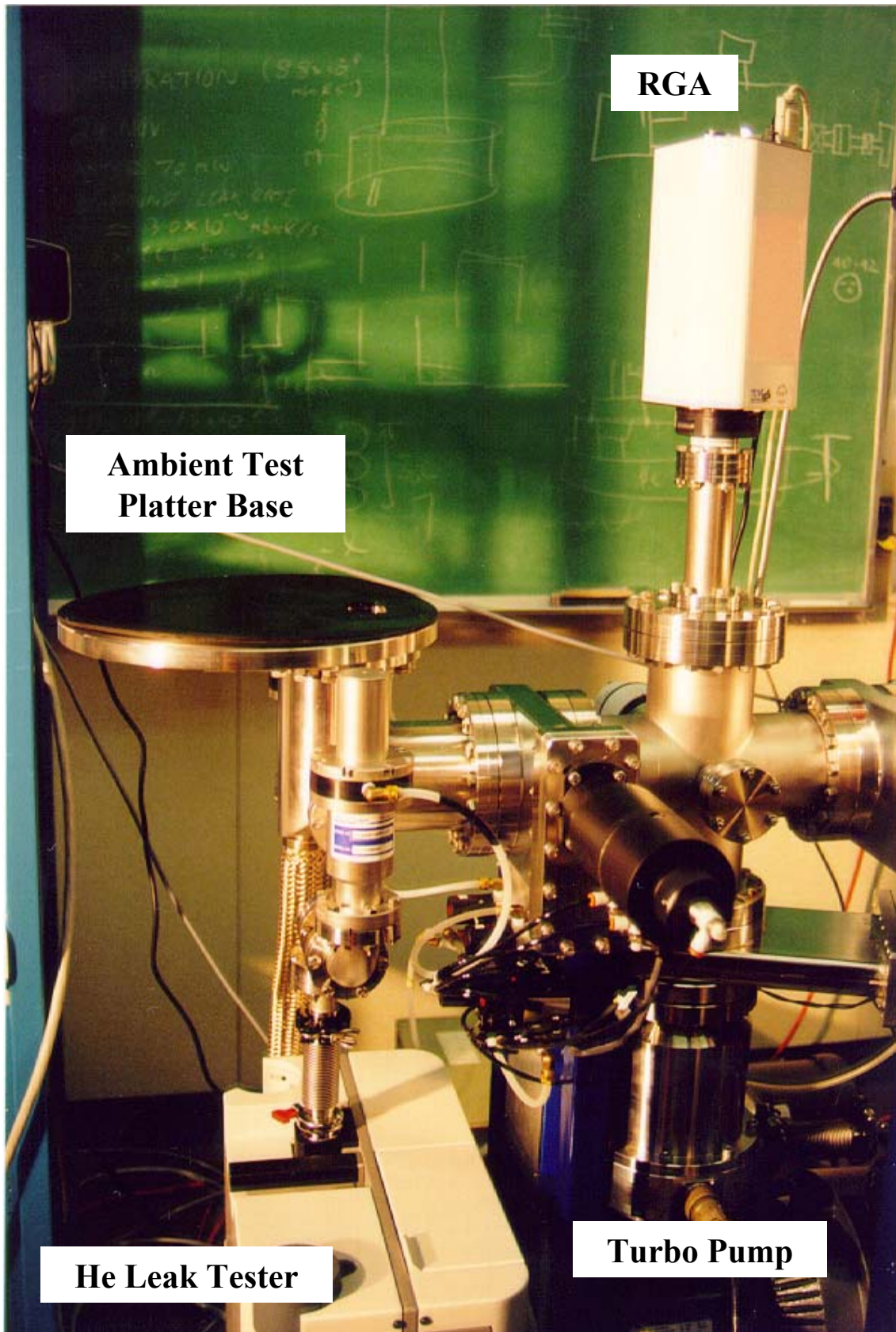


# Leak Test Setup in Victoria





# Leak Test Setup in Victoria



**Ambient Test  
Platter Base**

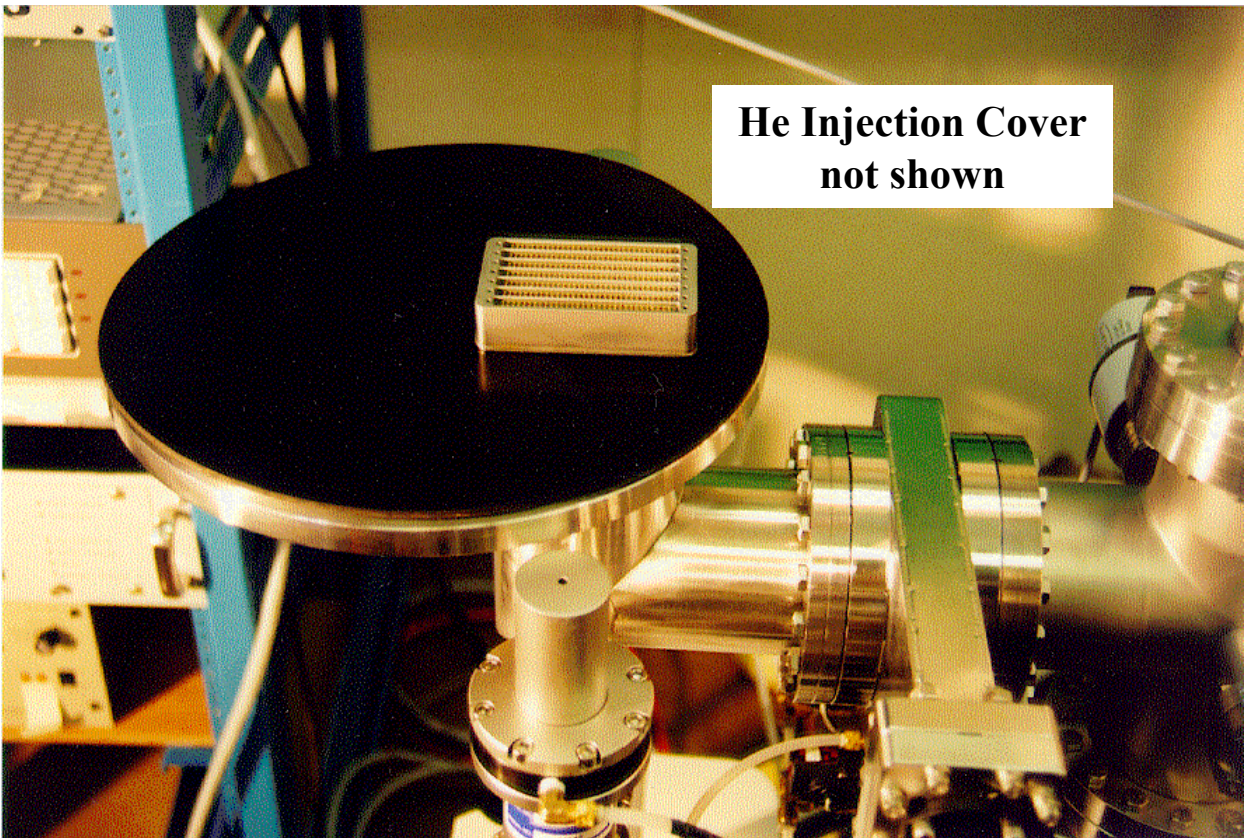
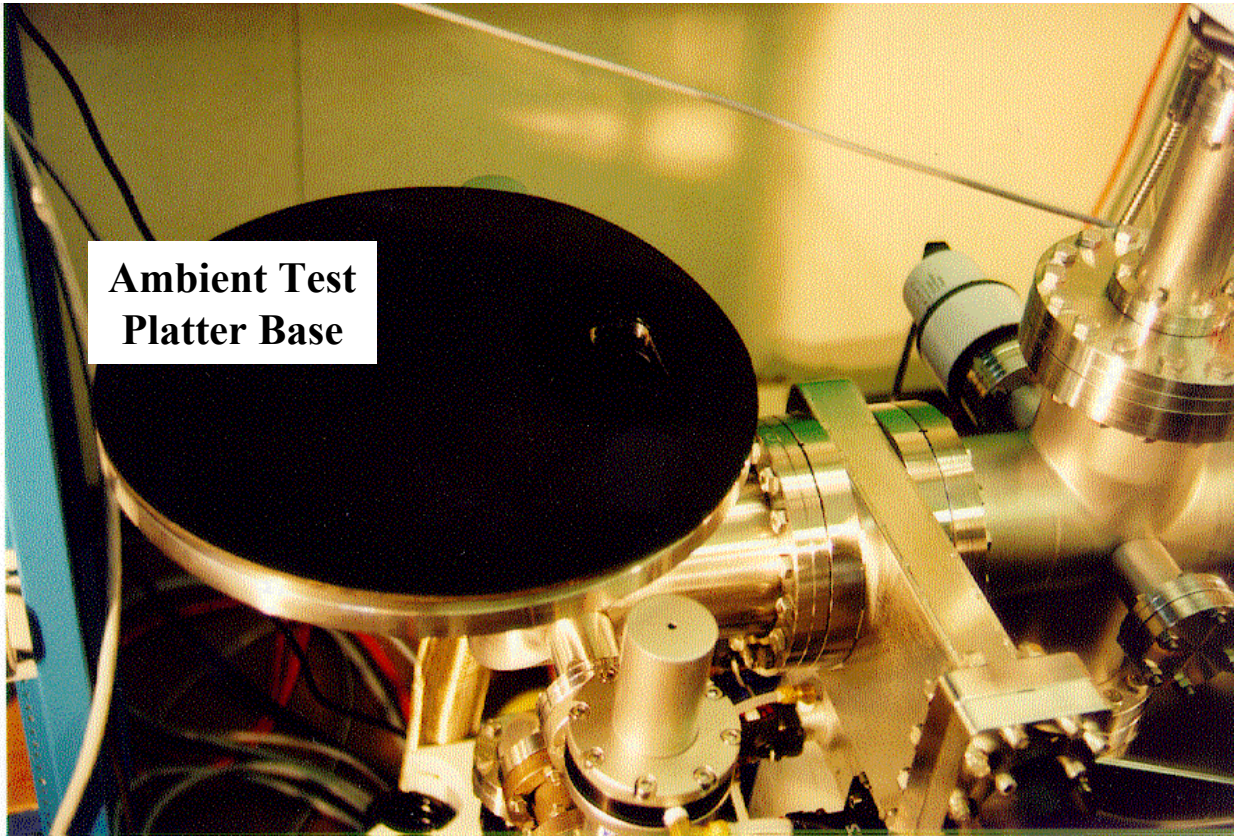
**RGA**

**He Leak Tester**

**Turbo Pump**

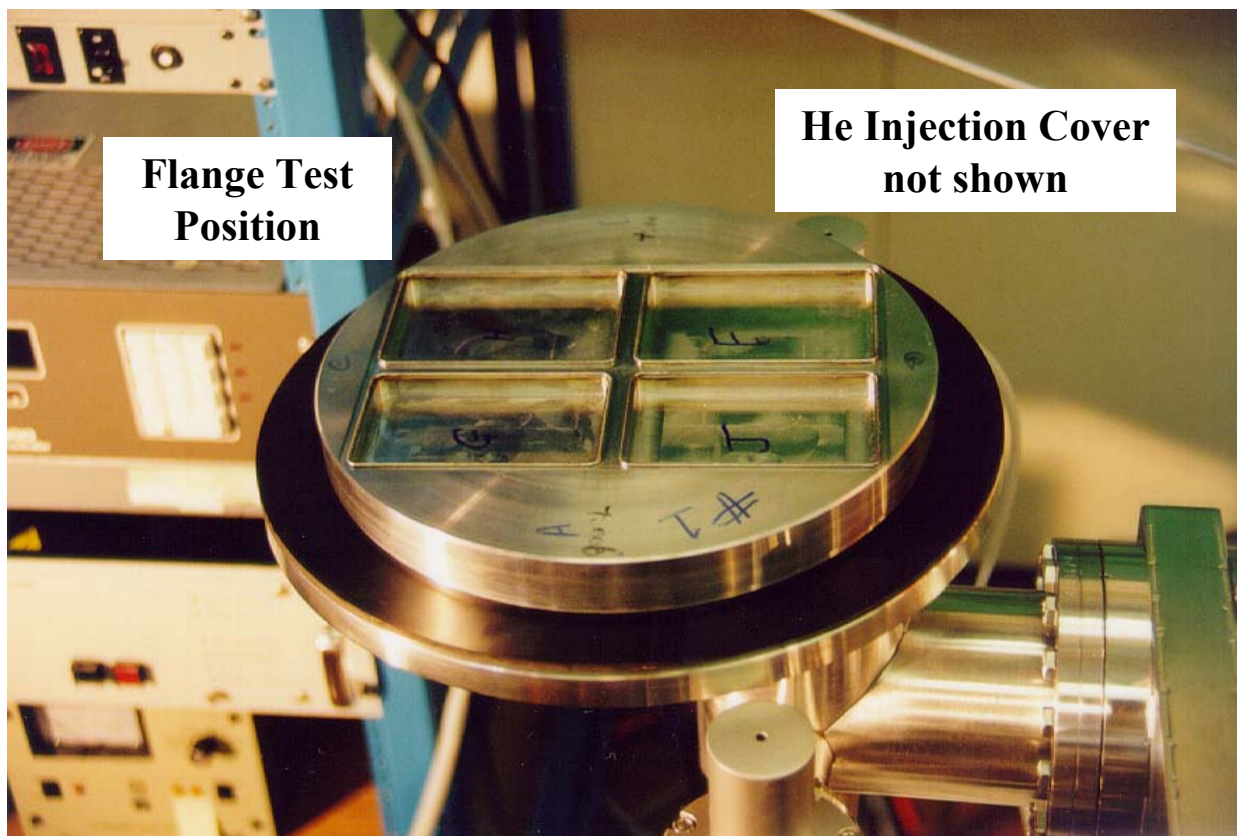


# Leak Test Setup in Victoria

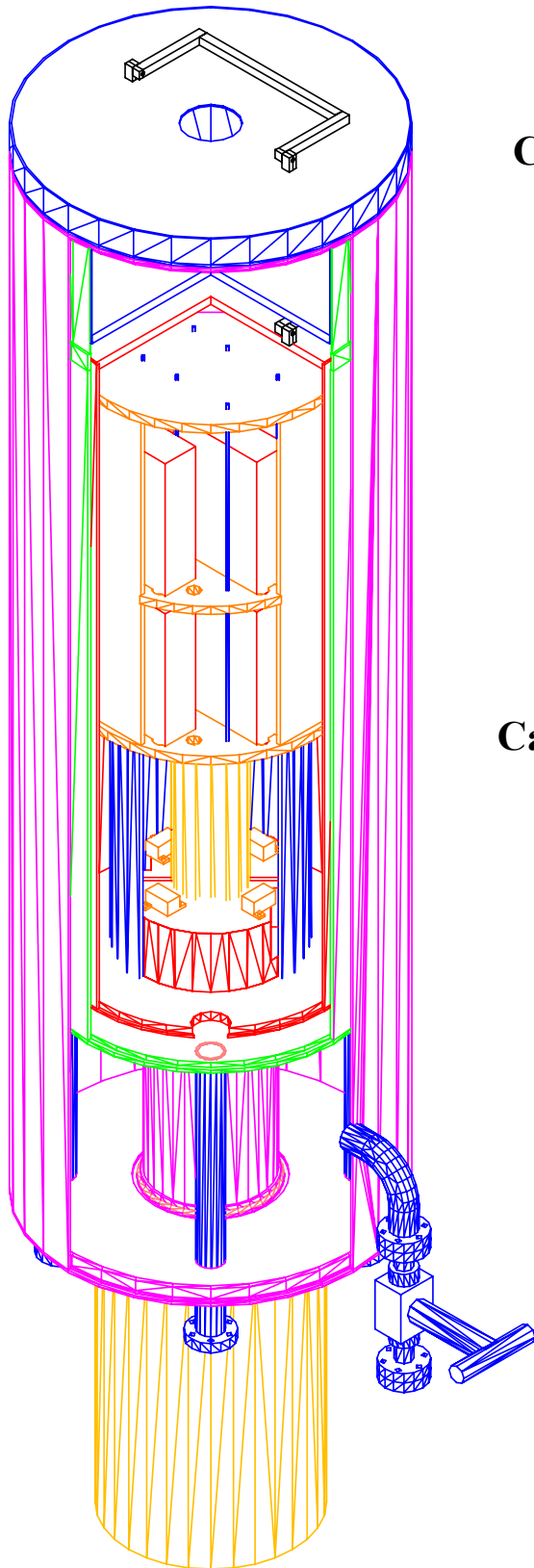




# Leak Test Setup in Victoria



# Leak Test Setup in Victoria



**Controlled Temperature Cycling  
Refrigerator for pin carriers**

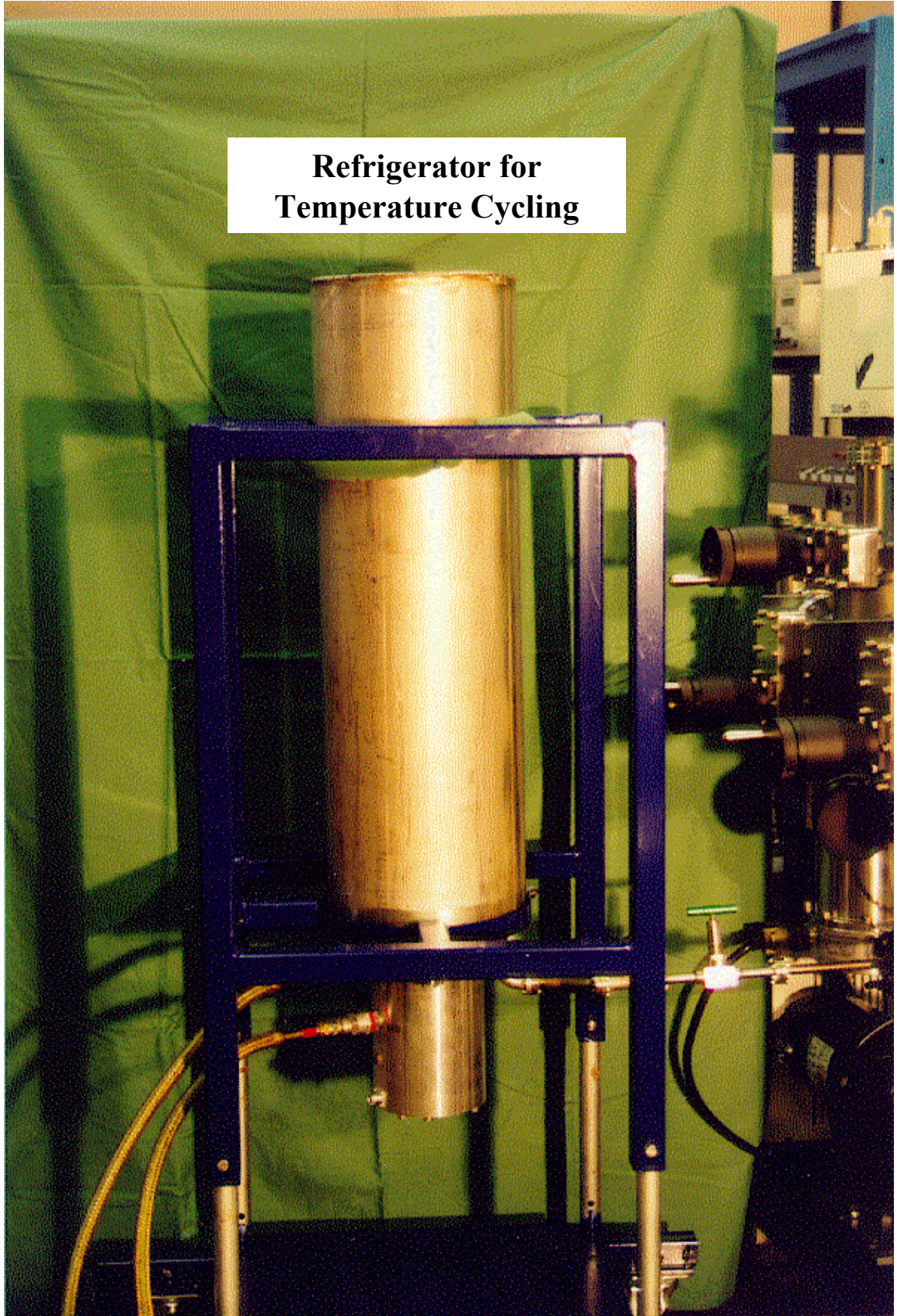
**All assembled**

**Capacity of 12 pin carriers**

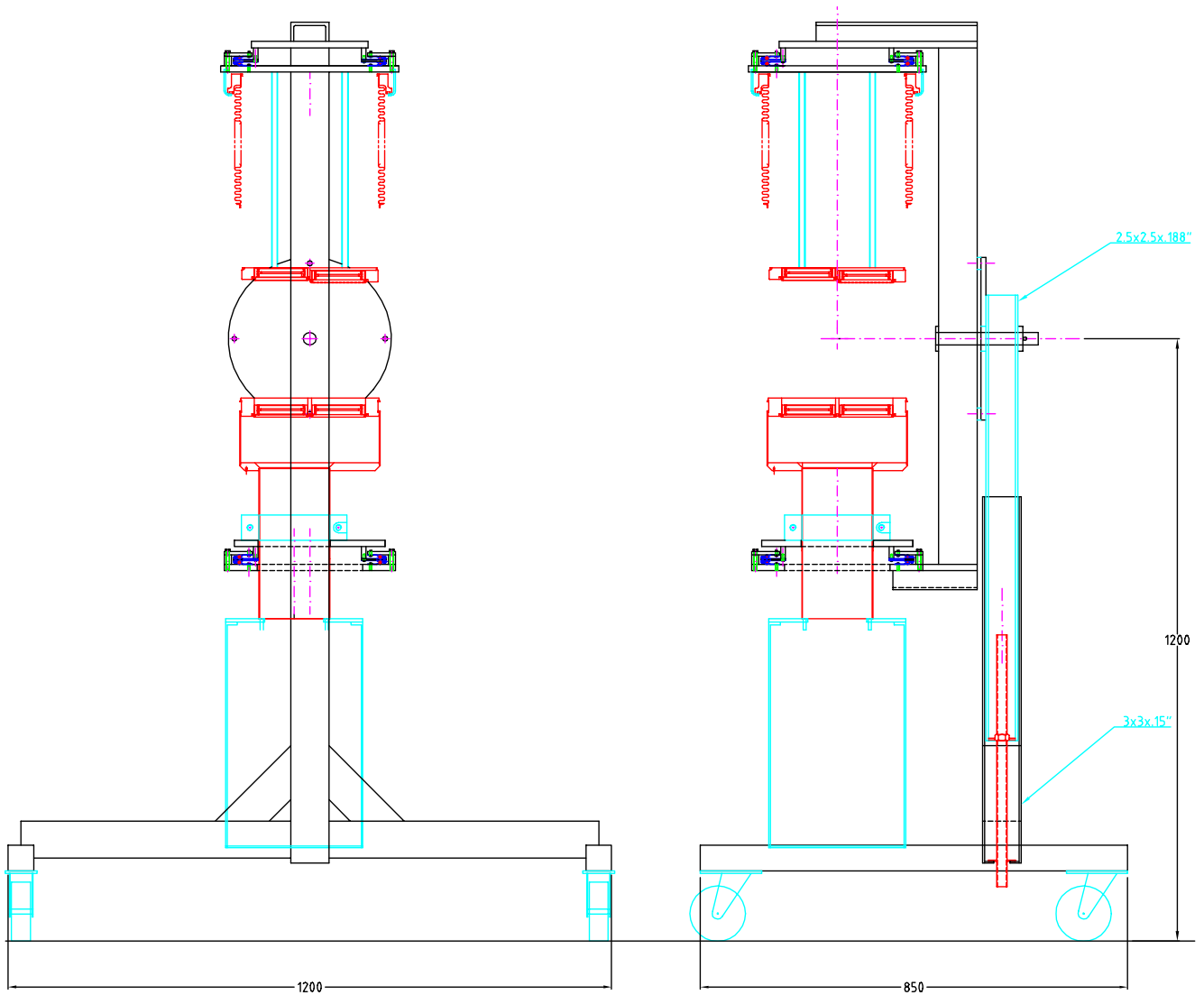
**Cooled by Cryocooler or LN<sub>2</sub>**



# Leak Test Setup in Victoria



# Assembly Jig in Victoria



- Rotation about horizontal and vertical axis possible
- Various assembly scenarios under study
- Being assembled



# Endcap Signal Feedthrough Project

## Canadian Responsibilities

- Design
- Fabrication
  - Signal Pigtails purchased from Orsay
  - Low Voltage Pigtails purchased from MPI
- Commissioning
- Transport
- Assistance during installation:
  - Considering to cover the cost of an orbital cutter
  - 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 Dowling	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



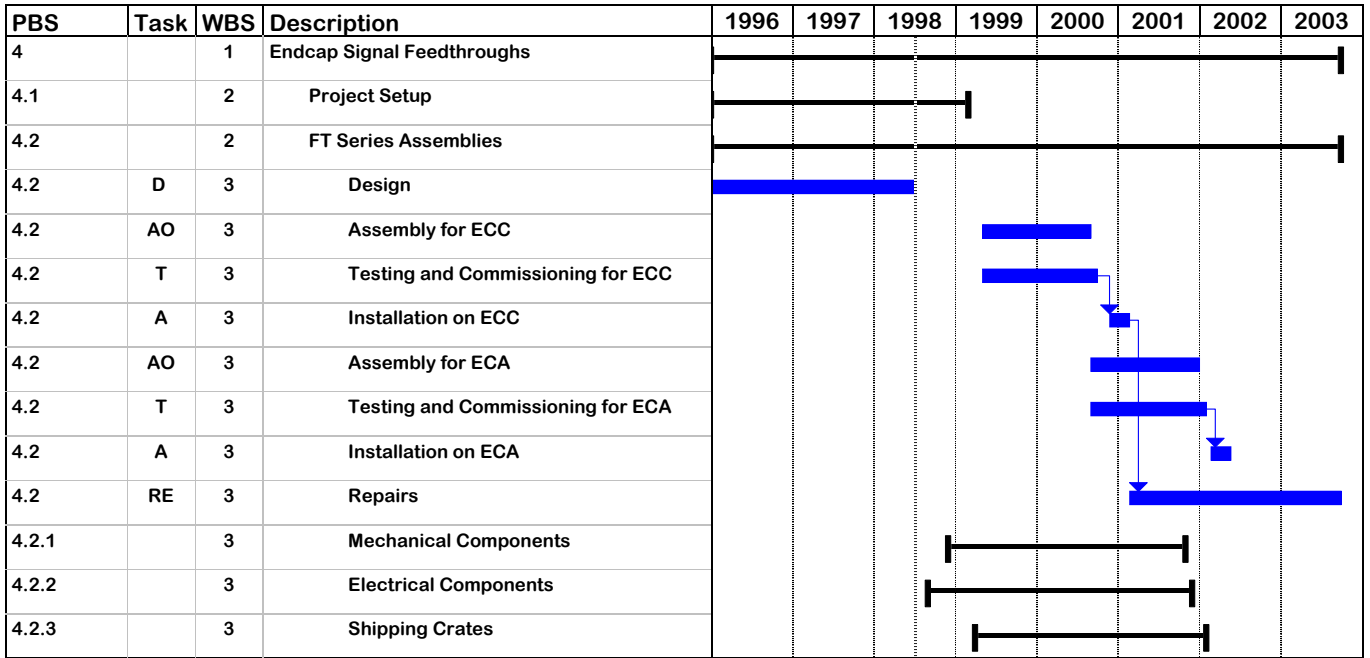
# Endcap Signal Feedthrough Project

## Top PBS Levels

<b>PBS</b>	<b>Task</b>	<b>WBS</b>	<b>Description</b>
4		1	Endcap Signal Feedthroughs
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
4.2.1.7		4	Pipe Fittings
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	Low Voltage Pigtail Cables
4.2.2.4		4	Low Voltage Vacuum Cables
4.2.2.5		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 Installation



## Dates Assumed (CB of 11/06/98)

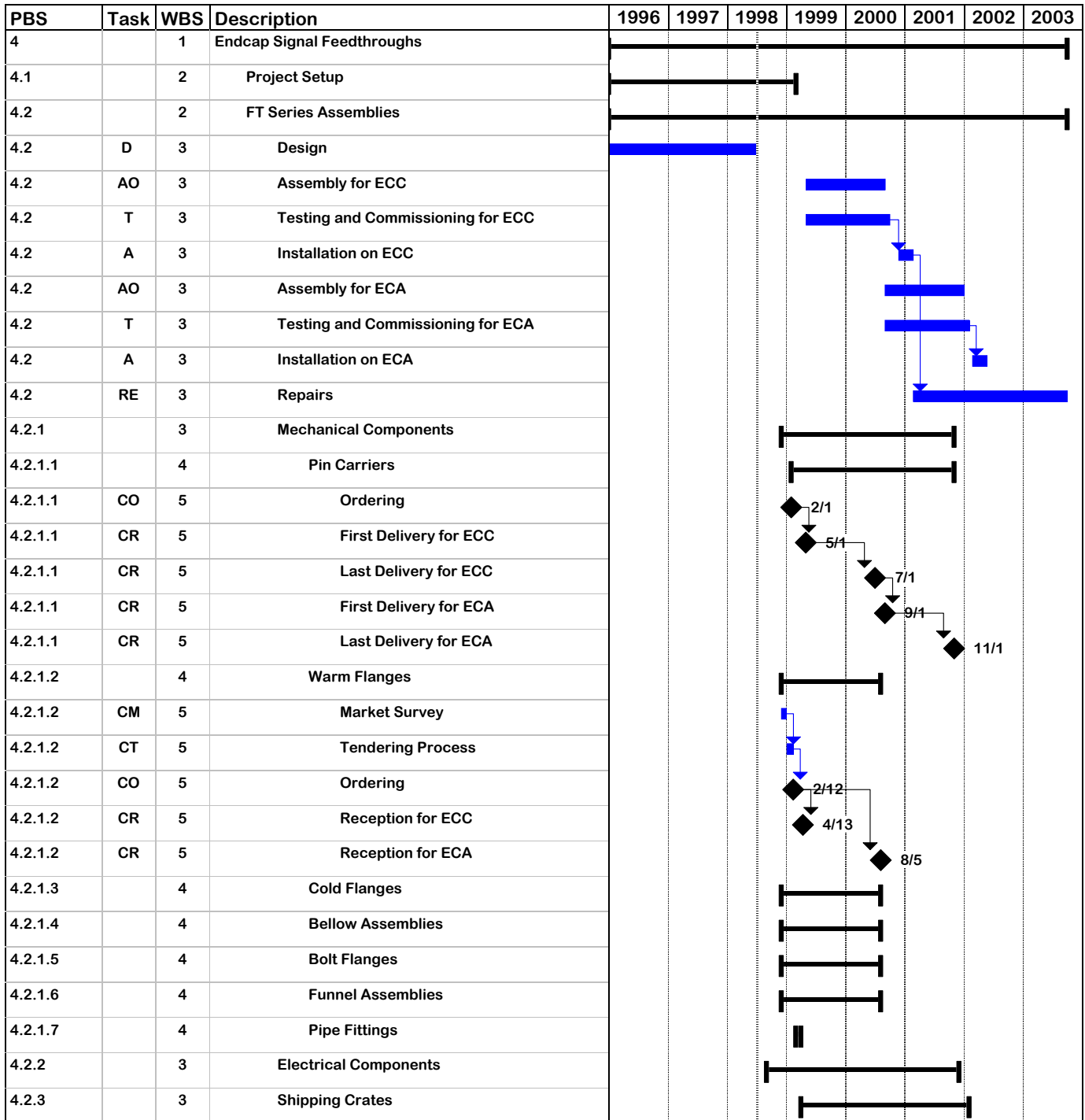
24/11/00 for 90 days      Installation on ECC

22/02/02 for 90 days      Installation on ECA



# Endcap Signal Feedthrough Project

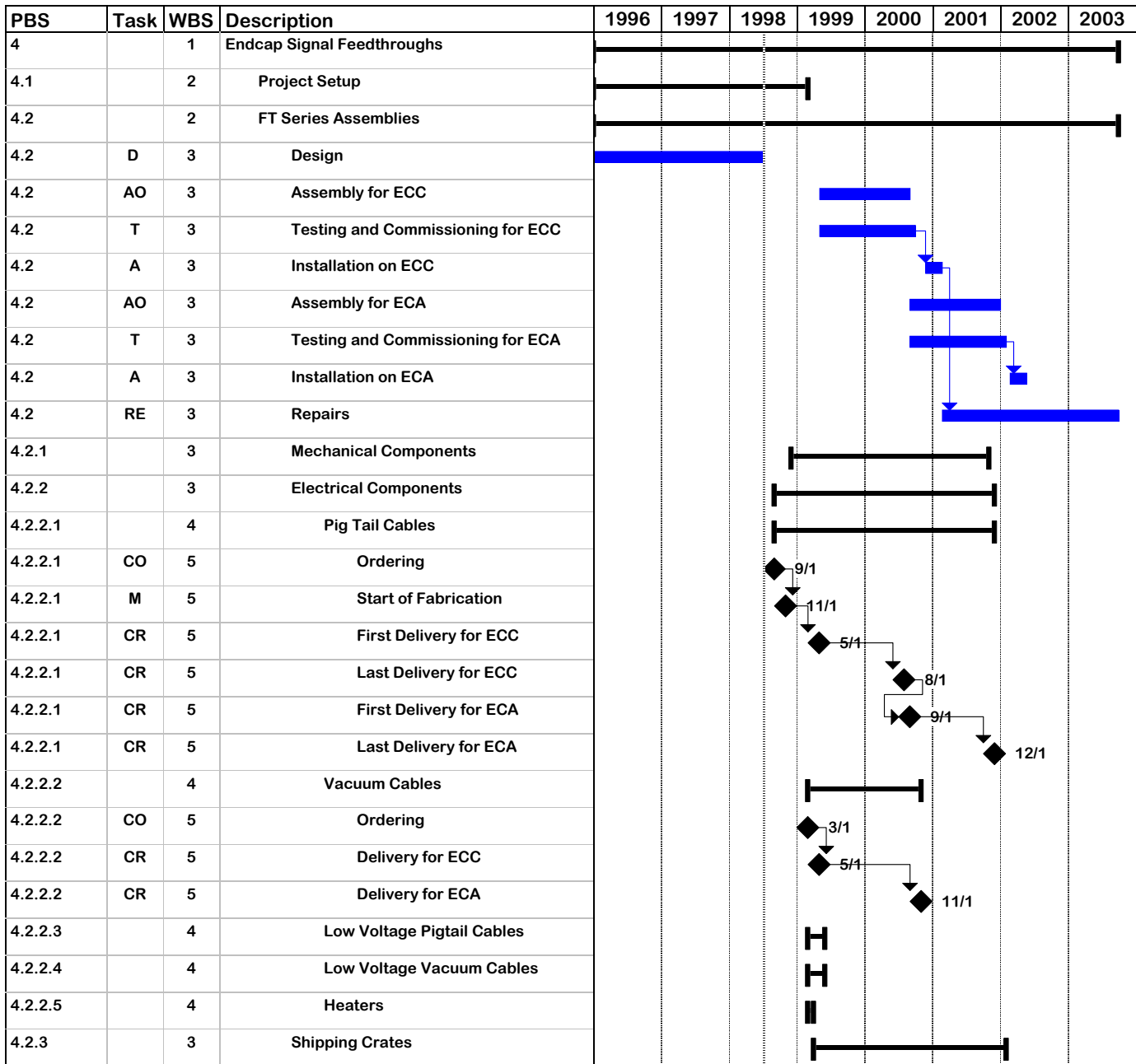
## Schedule: Mechanical Components



- Pin Carriers ordered shortly after PRR
- Contract preparation to start in 1998

# Endcap Signal Feedthrough Project

## Schedule: Electrical Components

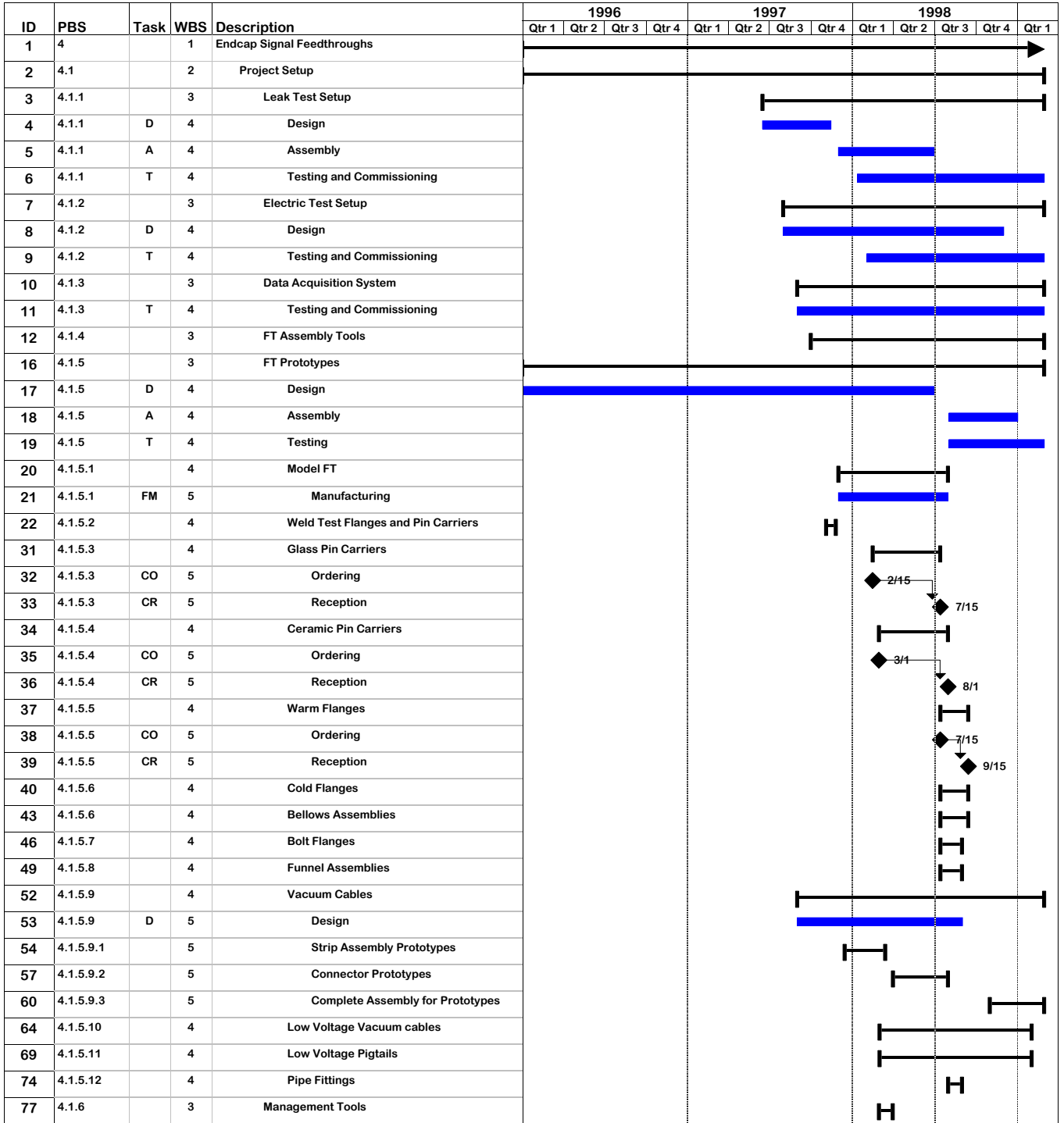


- Critical dates: Pigtails last delivery dates for EEC and ECA
- Currently, no contingency...



# Endcap Signal Feedthrough Project

## Project Setup Details



# Signal Feedthrough Notes

- **ATLAS LAr Calorimeter Signal Feedthrough:**
  - **Design**
  - **Assembly**
  - **Vacuum Cables**
  - **Pigtail Cables**
  - **Pin Carriers**
  - **Testing**
  - **Installation**
  - **QA and QC**
- **Work started in Victoria on Assembly/Testing/QA/QC**
  - **Model finished; assembly and testing procedures can be studied**
  - **Aim at very first draft for Sept LAr week**

# Vacuum Cables Low Voltage Cables

## Status Report

ATLAS LAr Week  
9th July 1998



Margret Fincke-Keeler  
TRIUMF and University of Victoria  
British Columbia, Canada

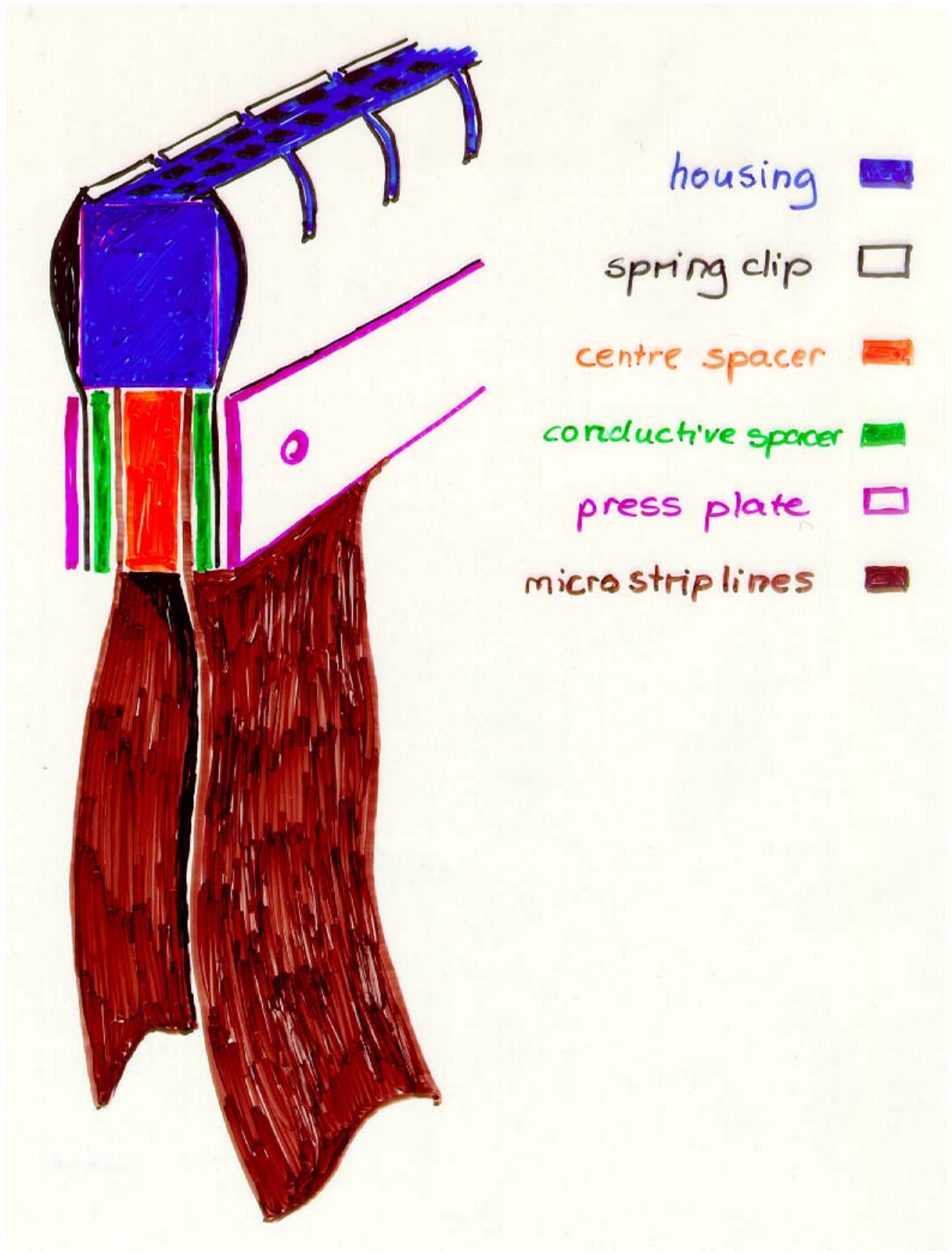


# Vacuum Cable Development in Canada

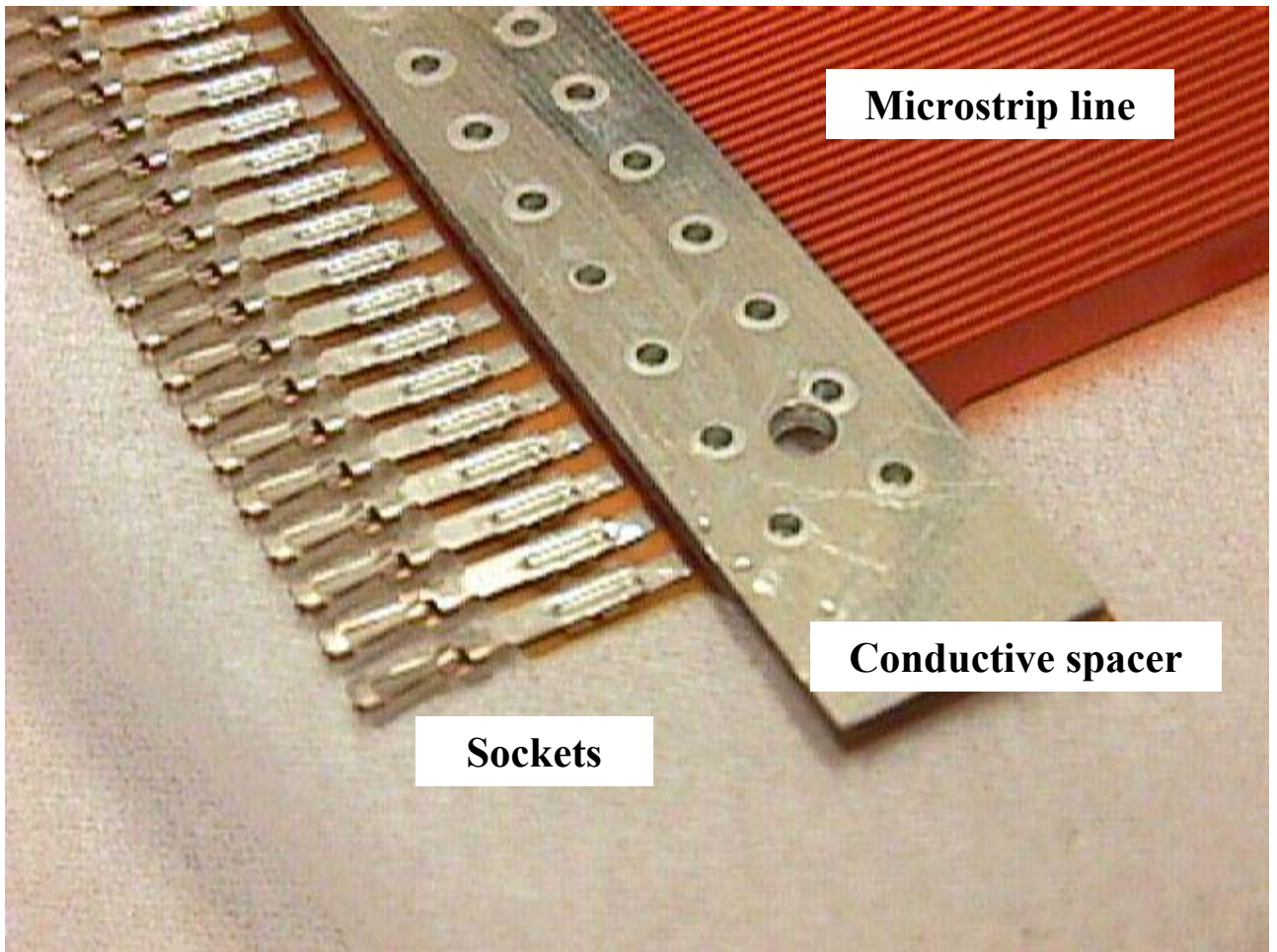
## Signal Cables

- All-Flex design
  - cables made up of 2 flexible microstrip lines
  - rigid part of the connector are assembled around the two strip lines
- Aim at simpler and cheaper design
- Design work:
  - E. Neuheimer (CRPP Carleton)
  - G. Hoepfel (Strataflex, Toronto)
- Connector design retained:
  - plated-through plastic spacers (Strataflex proposition)
- Prototypes in hand
  - one to BNL and one to Orsay for comments
  - Many thanks to Don Makowiecki for assistance
- Work towards pre-production order ongoing
- Desired schedule:
  - 1/09/98 Get comments from BNL and Orsay
  - 09/98 Workshop on vacuum cables ?
  - 11/98 Place pre-production order
  - 02/98 Test on pre-production cables
  - 03/99 Place production order
  - 05/99 First delivery for ECC (aggressive...)
  - 11/00 First delivery for ECA
- Comments:
  - We anticipate dates of last deliveries to be non critical

# Vacuum Cable Development in Canada

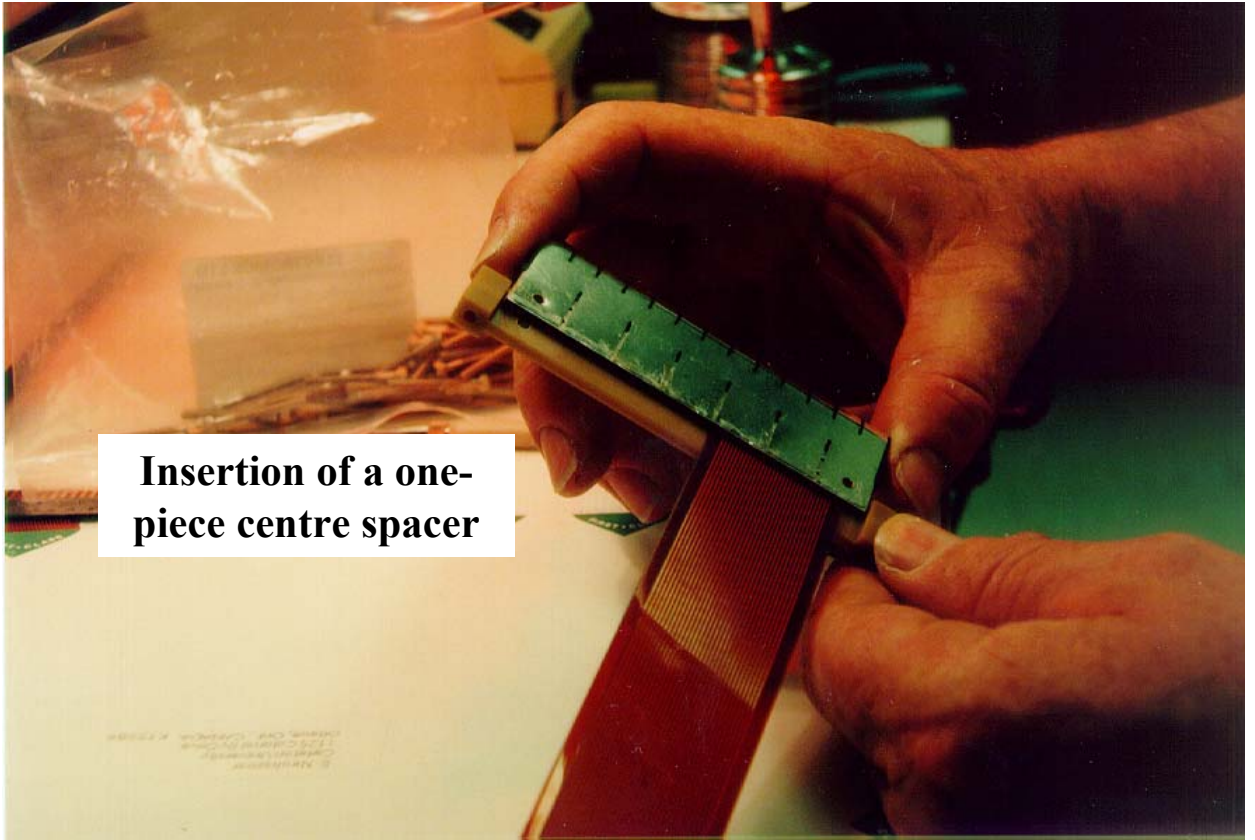


# Vacuum Cable Development in Canada

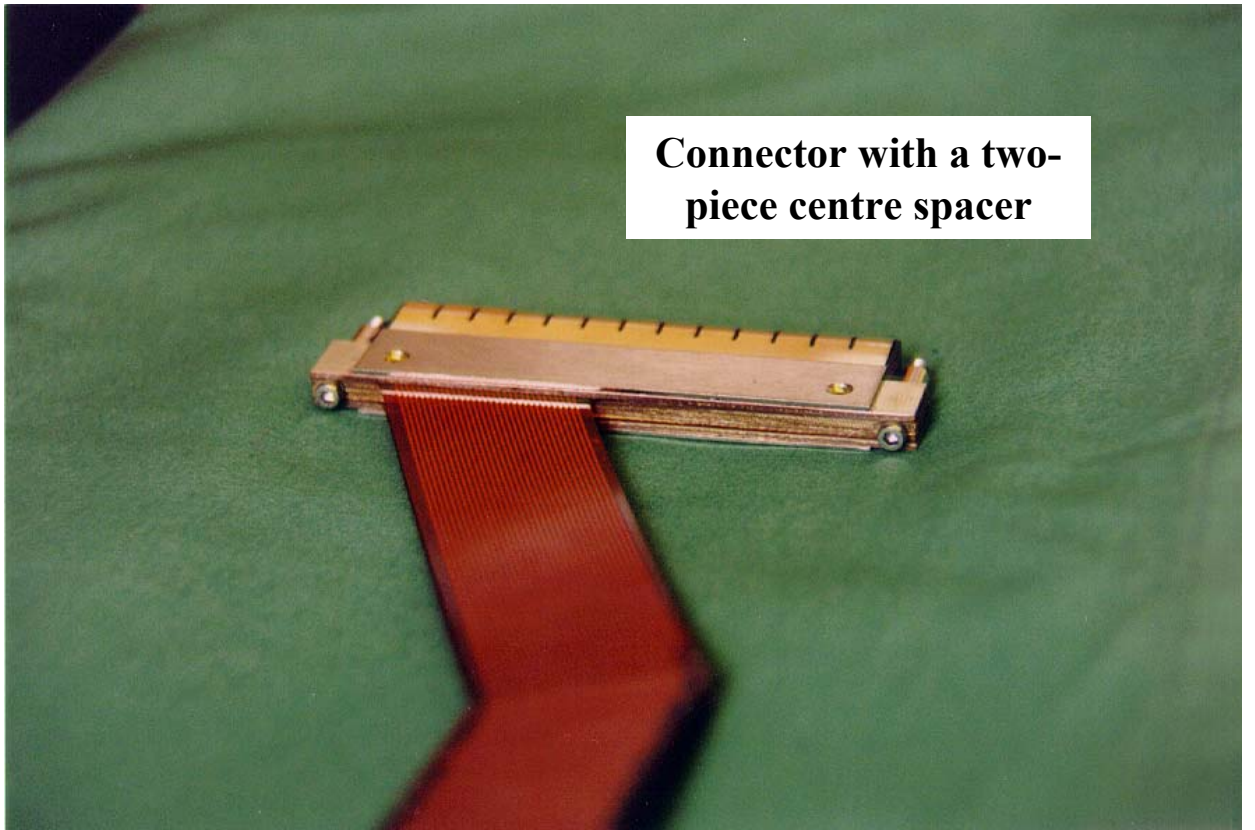




# Vacuum Cable Development in Canada



**Insertion of a one-piece centre spacer**



**Connector with a two-piece centre spacer**

## HEC Low Voltage Cables

- HEC requires **special vacuum cables** for the low voltage
  - A solution exists (M. Fincke-Keeler, P. Imbert) and is being investigated
  - Discussions with MPI concerning low voltage distribution scheme and low voltage cable layout progressing well
- HEC will use **special pigtails** for the low voltage distribution
  - A solution has been found (H. Oberlack)
  - Pre-production cables will be ordered early Fall 98
  - MOU between Victoria and MPI in the making
- Though these issues clearly require constant efforts, we do not foresee procurement problems at this time