Argonne NATIONAL LABORATORY

... for a brighter future

U.S. Department of Energy

UChicago ▶ Argonne LLC

Office of Science U.S. DEPARTMENT OF ENERGY

A U.S. Department of Energy laboratory managed by UChicago Argonne, LLC

Superconducting RF for ILC at ANL

May 10, 2007

ANL Group: Mike Kelly, Scott Gerbick, Bill Boettinger (NE)

FNAL Collaborators: Cristian Boffo, Kerry Ewald

Speaker: Mike Kelly

ANL Activities/Projects in Superconducting RF

Projects/Activities

ILC | **ATLAS** | **AEBL** | **ERL** | **HINS**

Manpower/Partners

ANL SRF Group
M. Kelly, J. Fuerst, S.Gerbick
K. Shepard (1 day/week)

- Coordination
- Nb procurement, QA
- Mechanical & EM design
- Chemistry
- Clean processing & assembly
- Testing

AES
Niobium tooling and forming

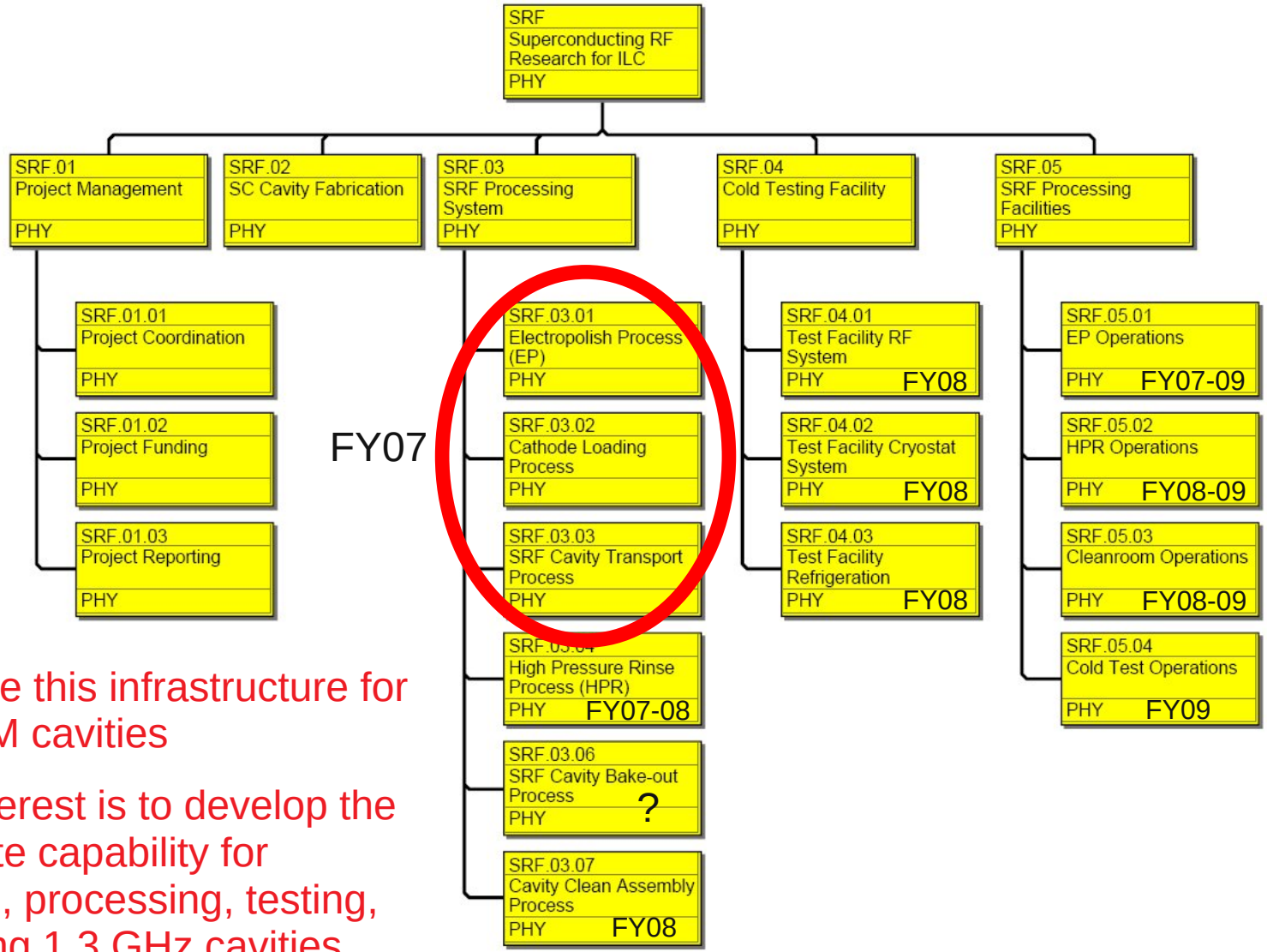
Sciaky
Electron beam welding

ANL Shops
Meyer Tool
Brazing
Stainless machining

ANL SRF Facilities

203 Cold Test Facility | **203 Surface Prep Lab** | **SCSPF**

V. Components of ANL SRF Effort for ILC



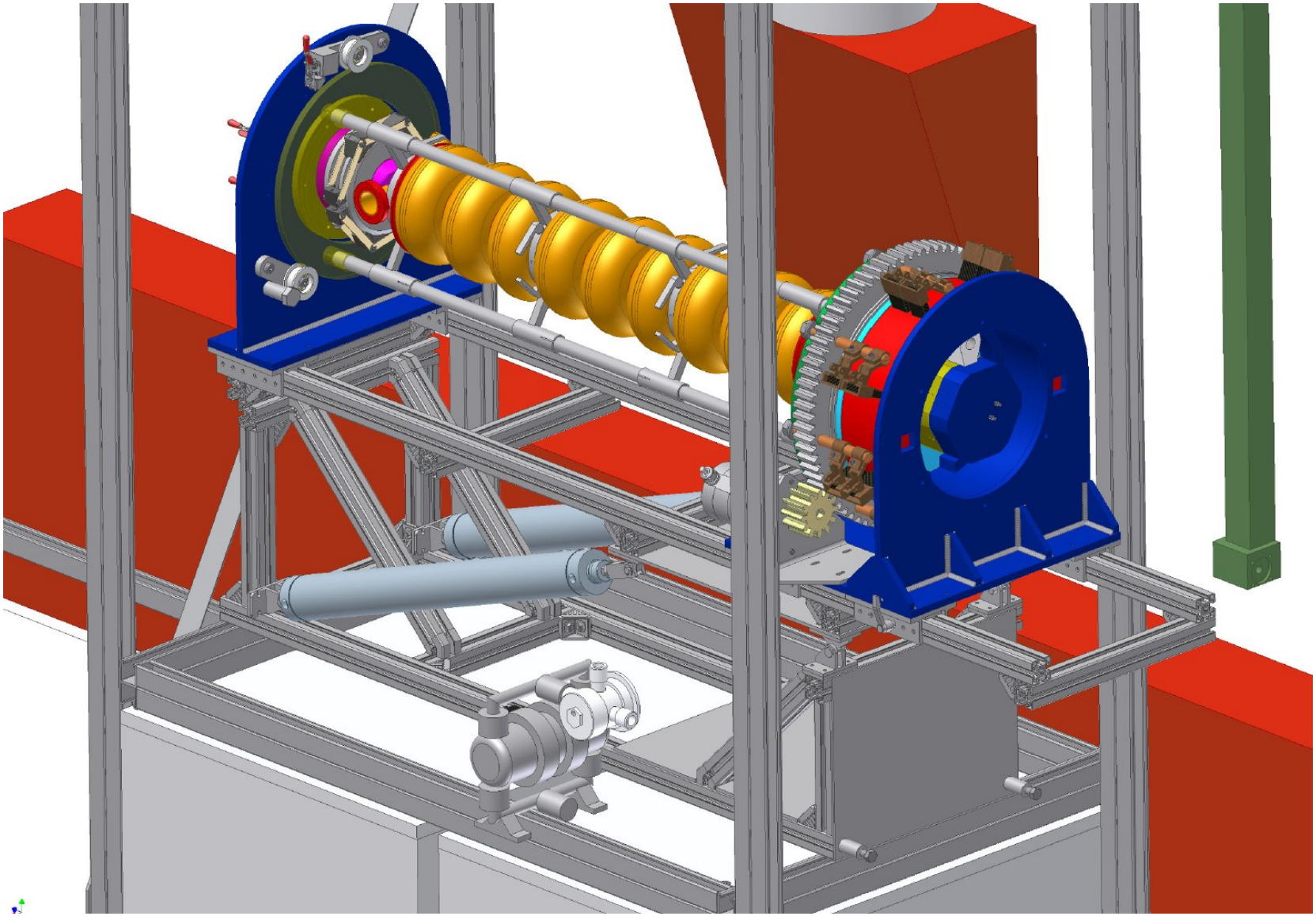
We have this infrastructure for 4 K TEM cavities

ANL interest is to develop the complete capability for building, processing, testing, operating 1.3 GHz cavities

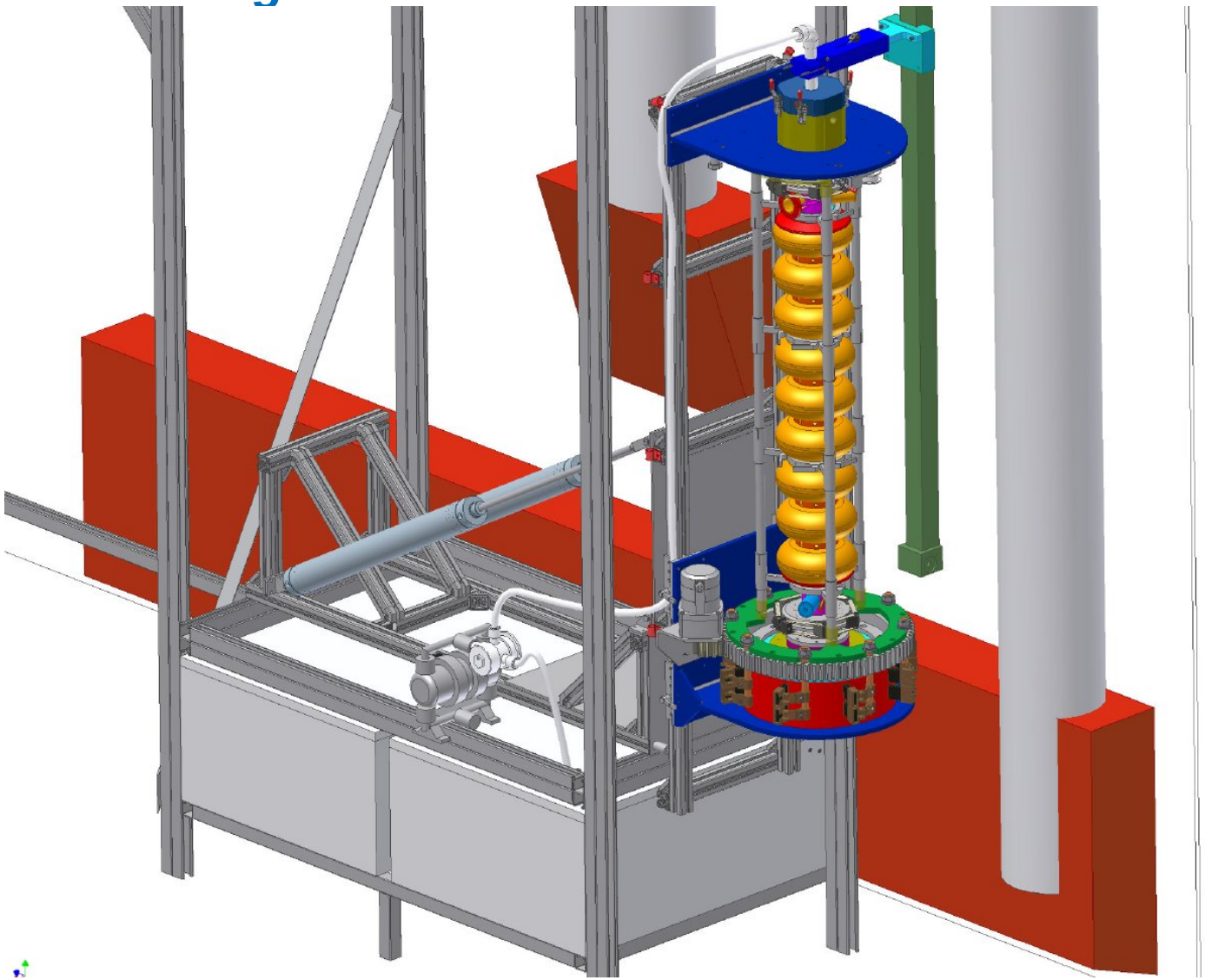
GDE Planning for US Cavity Processing Throughput Electropolishing

	Cavity processing capabilities		
	FY07	FY08	FY09
Cornell	12	12	12
Jlab	30	40	50
ANL/FNAL	Build	50	60
New FNAL			Build
New FNAL			
Total	**42**	**102**	**122**
Tight loop	**18**	**18**	
Production	**24**	**84**	**122**

IV. Technical Approach: Horizontal Orientation during EP



IV. Technical Approach: Cathode Loading, Acid Draining, Water Rinsing



Electropolishing Design Review at ANL, Feb 2007

- Attendees: Hasan Padamsee (Cornell), Kenji Saito (KEK), Tsuyoshi Tajima (LANL), Lutz Lilje (DESY), Axel Matheisen (by phone DESY), Marc Ross (FNAL), John Mammosser (JLAB)

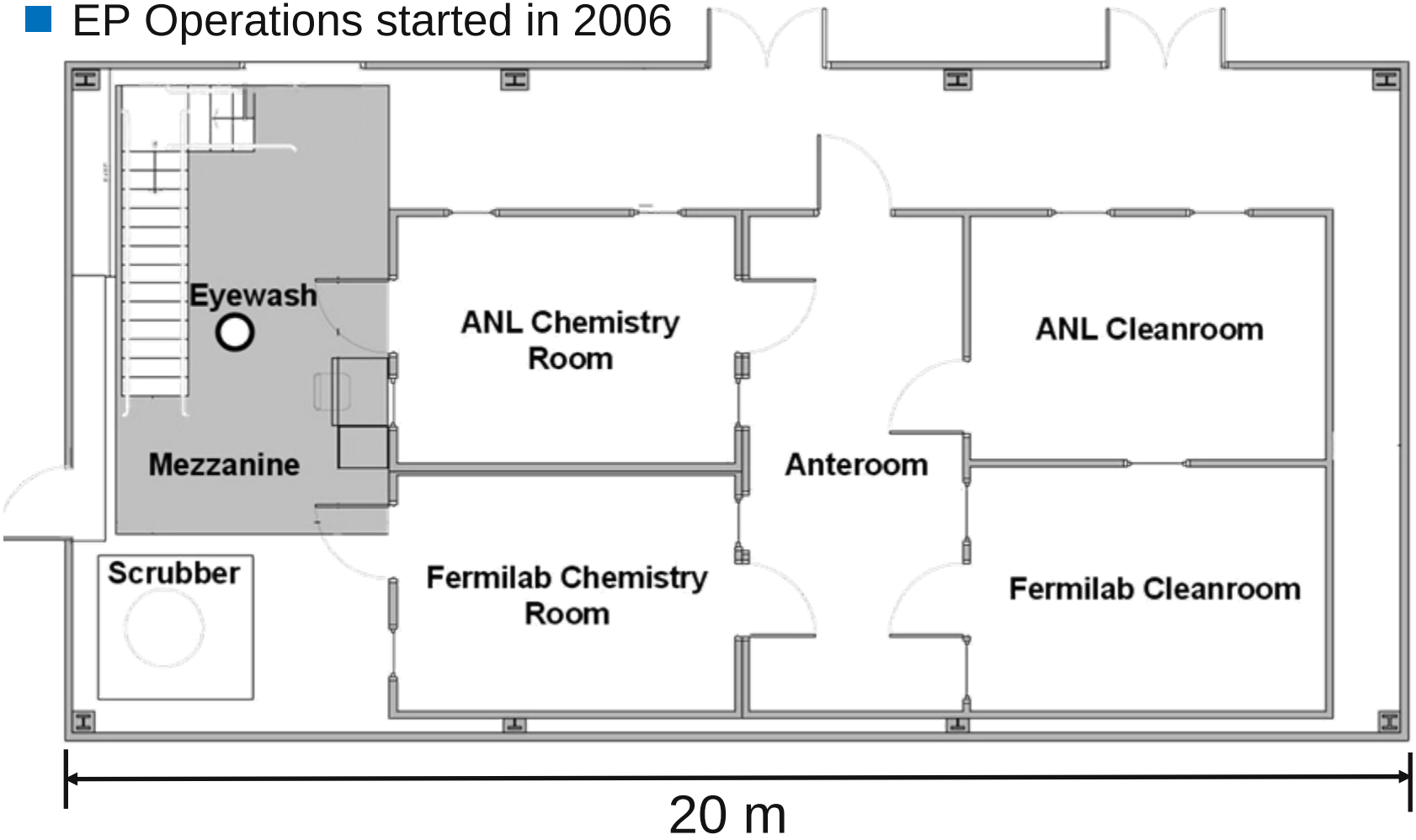
Charge to the Committee

- Evaluate the technical soundness of the design to meet the ANL/GDE EP goals for FY07-FY09. Does the design meet the criteria in the specification document generated jointly by ANL/FNAL which was reviewed at the TTC-KEK meeting?
- Will the system be ready for commissioning in July 2007 using a single-cell niobium cavity?
- Assess the suitability of the design for performing up to 11 EP procedures in FY07.
- Assess the suitability of the design for performing up to 50 EP procedures per year in FY08-09.

Written and verbal feedback was very positive

SCSPF: Superconducting Cavity Surface Processing Facility Location: Argonne Building 208

- Facility Cost with manpower $2M
- Safety Review Completed in 2006; 700 man-hours and $100K
- EP Operations started in 2006



SCSPF: ANL Portion

QWR Electropolishing System in ANL Chemistry Room

SCSPF Electropolishing for ATLAS

SCSPF: Control Console/Procedure Monitoring

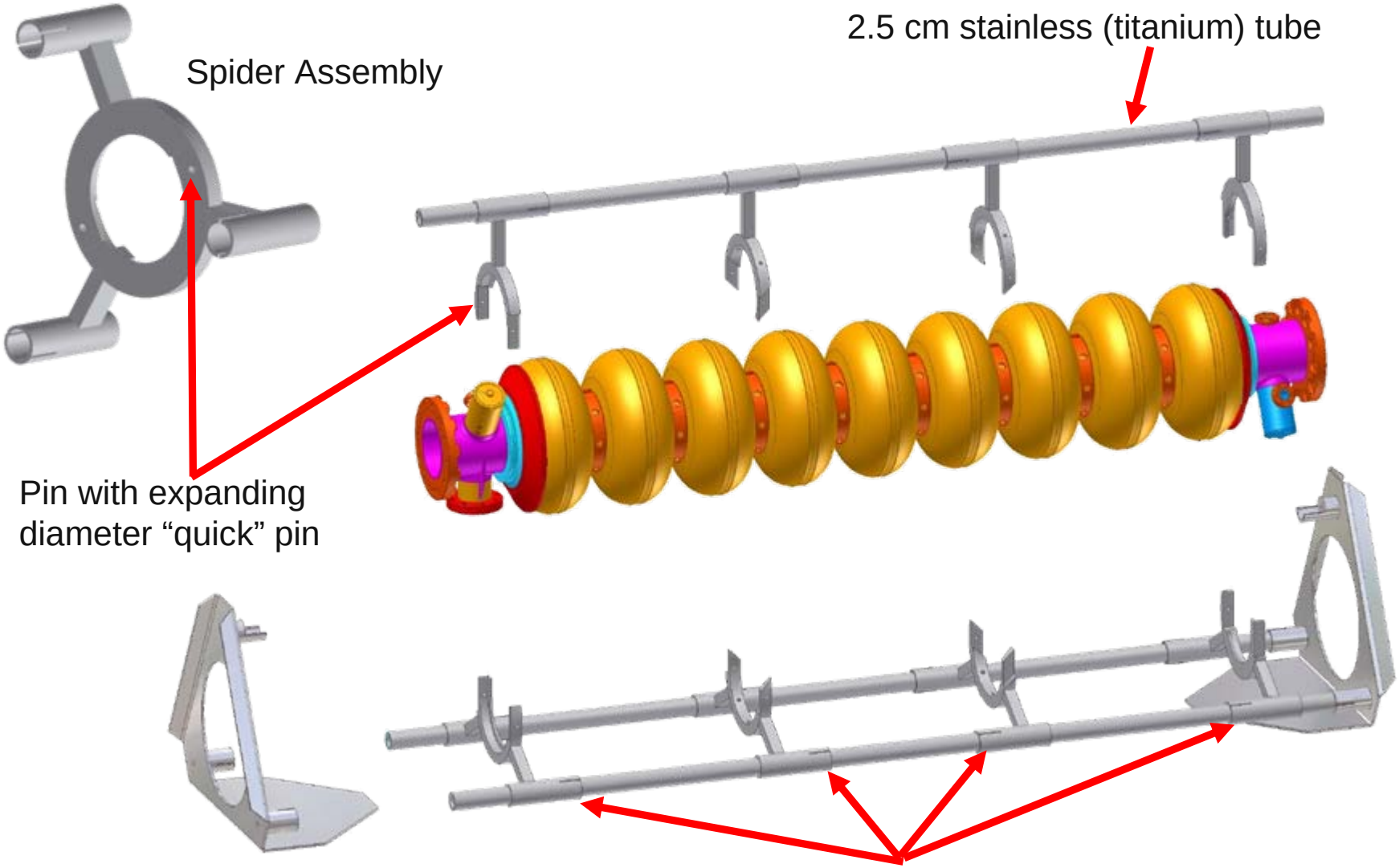
Assembling the ILC Hardware in the ANL chemistry room

ILC EP Project Status

- EP Design Specification 100% complete
- EP Engineering Design 100% complete
- EP Design Review 90% complete
- EP System/component procurement 80% complete
- EP system assembly 30% complete
- EP Interface with industry 10% complete (this activity limited by funding in FY07)
- HPR following EP under design/construction in the SCSPF (this activity limited by funding in FY07)

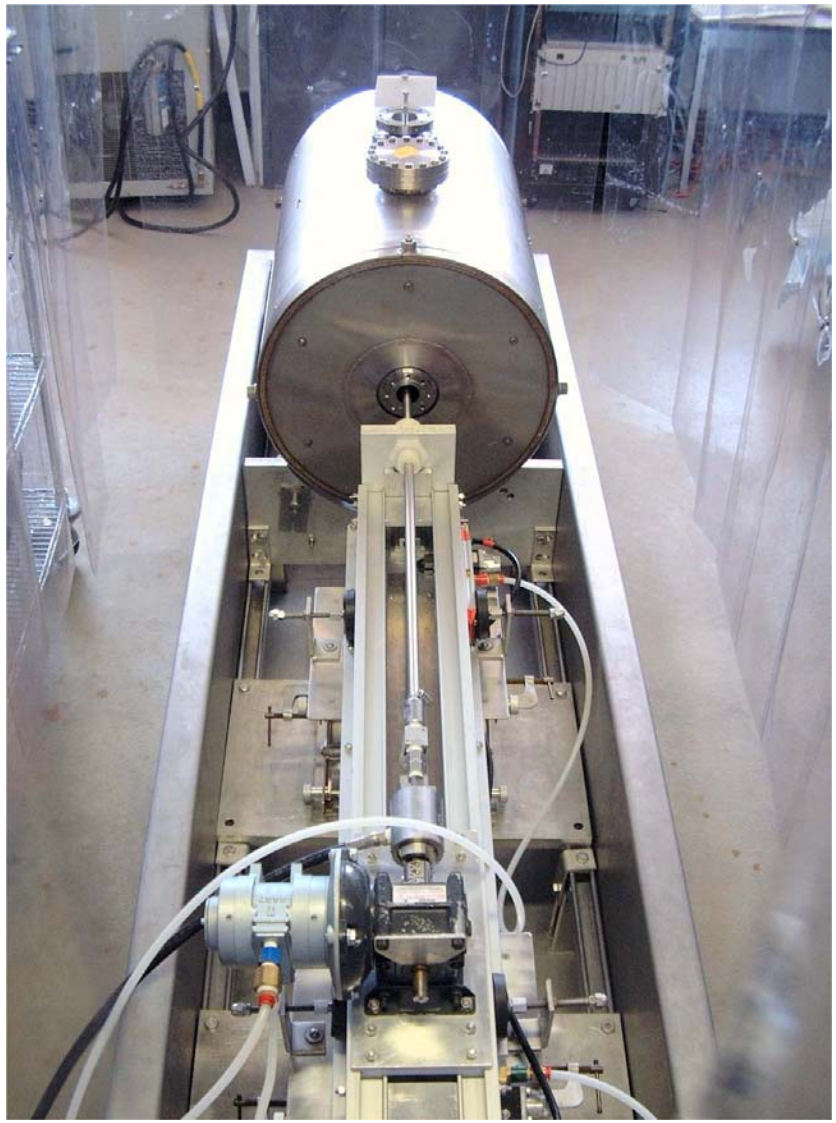
- We are on track to perform electropolishing for ILC by July 2007

Additional Material: A Cavity Holding Fixture



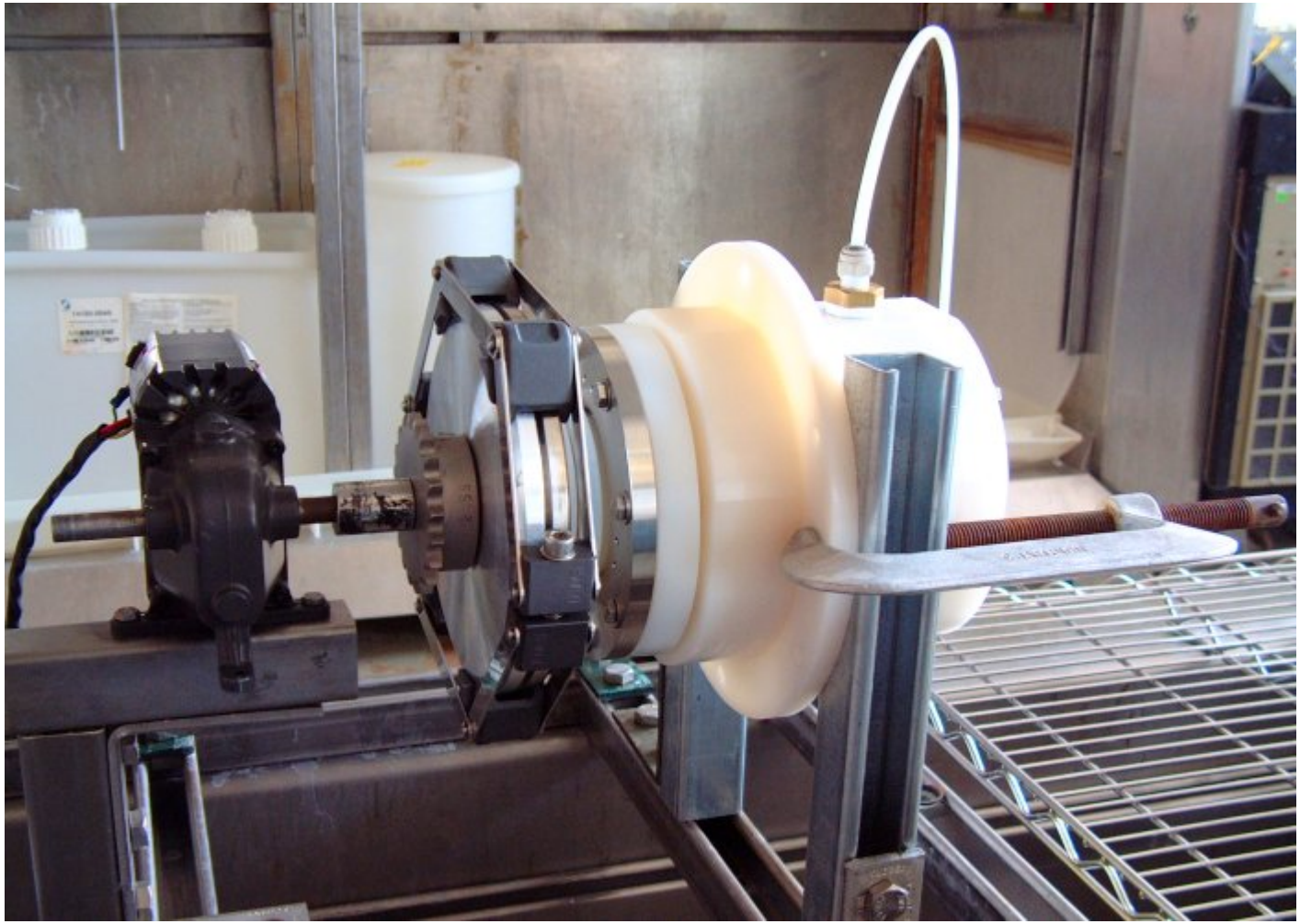
Additional Material: HPR in G150 facility

- Supplied with 18 MΩ-cm deionized water at 20 l/m, up to 3000 PSI
- Rinsed and dried in a curtained clean area



Additional Material: Test of End Group Fri. Feb 9, 2007

- Filled with water, rotated shaft on lip seal at 20 rpm, pressurized to 2 PSI
- First test looks good; long term operation to be tested



Additional Material

- Fluoride specific electrode; untested; requires dilution by ~50X