

JRA1 - SRF (WP 10)

« Cryostat Integration Tests »

The word "CARE" is written in large, white, serif capital letters. The background behind the letters is a dark blue field with a bright blue horizontal beam of light passing through the center. From this beam, numerous thin, white, curved lines radiate outwards, resembling particle tracks or synchrotron radiation patterns.

CARE

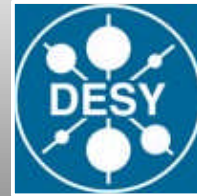
in Cry-Ho-Lab

Cry-Ho-Lab (Cryostat Horizontal de Laboratoire)

Cryostat
RF power
30 weeks (LHe)
Manpower



Cavity
9 cells
1.3 GHz



high power
coupler
TTF III



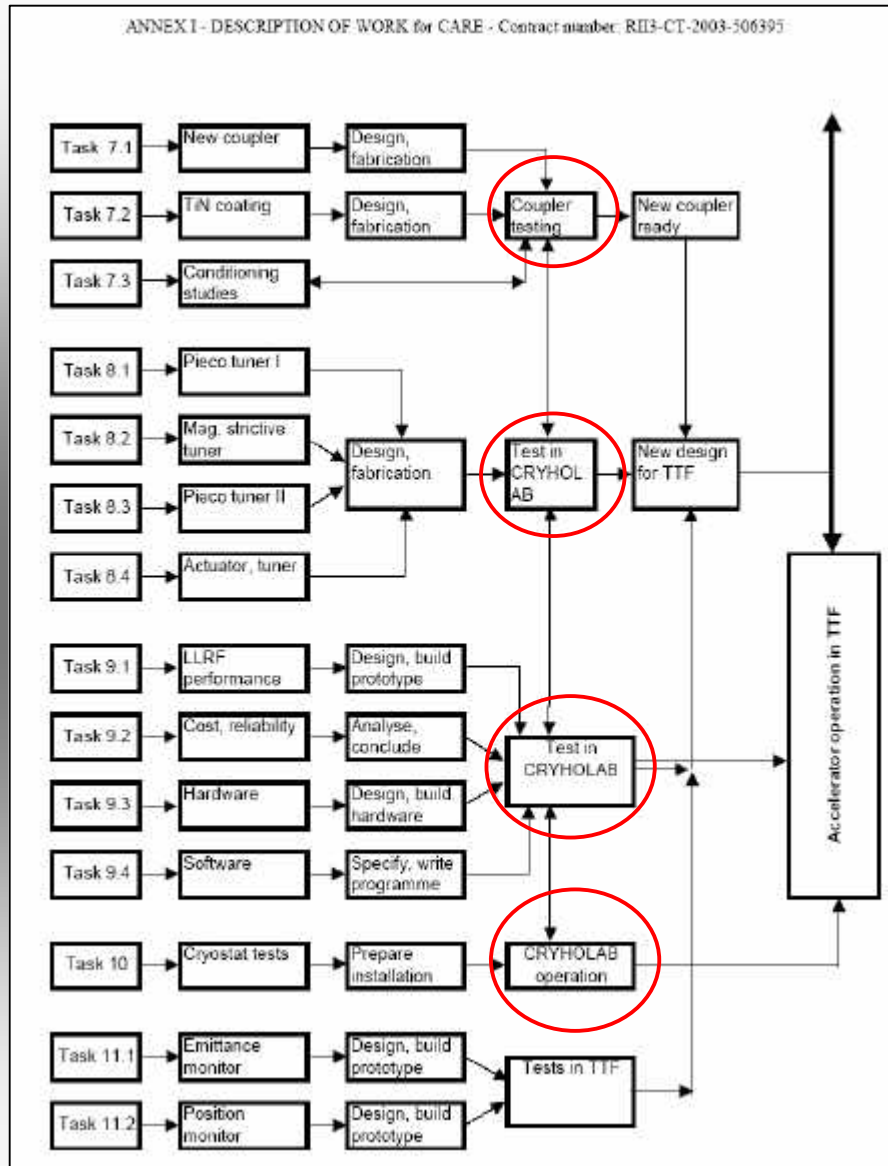
WP 7 (new couplers)

WP 8 (tuners)

WP 9 (low level RF)

WP 10 (RF tests)

The deliverables of this WP
concern the results of tests



CARE Proposal (Annexe I)

« description of work »

4 Work-Packages

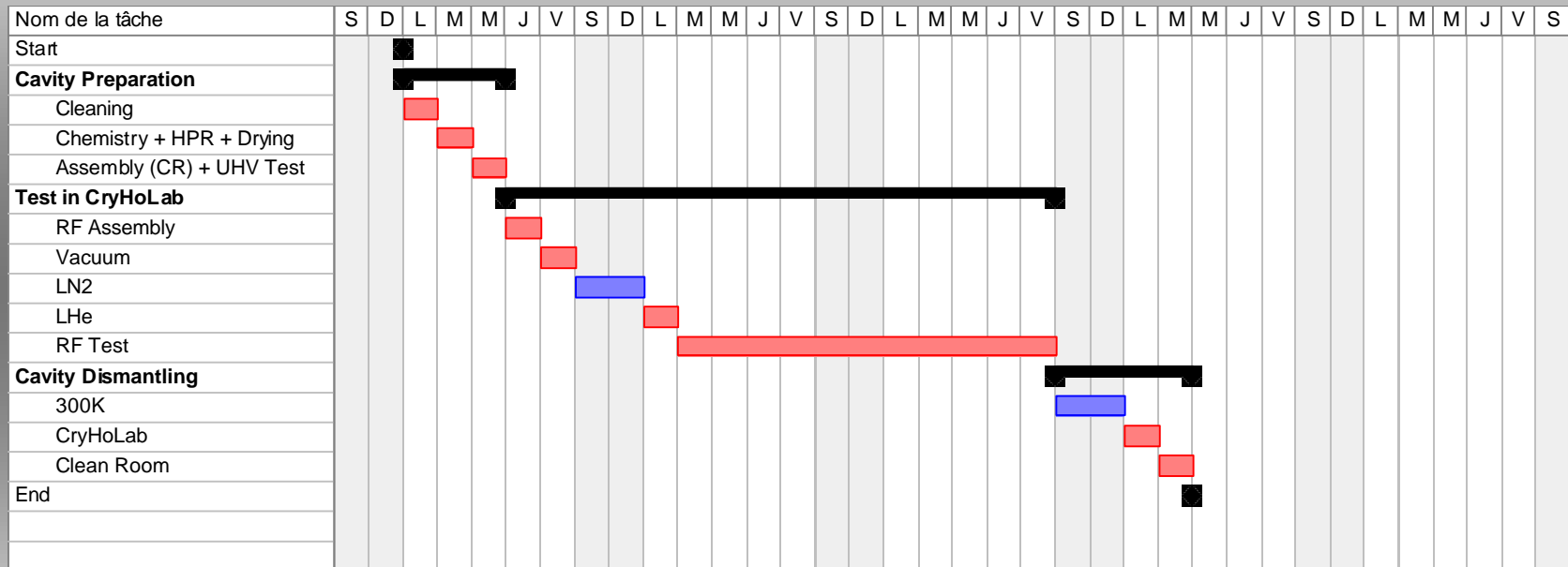
(WPs 7-8-9-10)

ANNEX I - DESCRIPTION OF WORK for CARE - Contract number: RII3-CT-2003-506395

Task Name	Milestones, Deliverables	2004				2005				2006				2007				2008	
		T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	
WP8 TUNERS																			
UMI TUNER																			
Control electronics		[Gantt bar from T4 2004 to T2 2008]																	
Tuner design		[Gantt bar from T1 2004 to T3 2005]																	
MS Tuner design finished	Design Report	[Milestone diamond at T3 2005, labeled 15/04]																	
Tuner fabrication		[Gantt bar from T2 2005 to T4 2006]																	
Fast piezo tuner design		[Gantt bar from T3 2005 to T1 2007]																	
Piezo fabrication and bench tests		[Gantt bar from T4 2006 to T2 2007]																	
Cavity tuner coupler integration		[Gantt bar from T1 2007 to T4 2007]																	
Pulsed RF tests		[Gantt bar from T2 2007 to T4 2007]																	
Magneto-strictive Tuner																			
Complete specification		[Gantt bar from T4 2004 to T2 2005]																	
Conceptual design		[Gantt bar from T1 2004 to T3 2005]																	
Prototype and performance evaluation		[Gantt bar from T2 2005 to T4 2006]																	
Finalize tuner and drive electronics design		[Gantt bar from T3 2005 to T1 2007]																	
Test of tuner		[Gantt bar from T4 2006 to T2 2007]																	
MS Report on magneto-strictive Tuner	Status Report	[Milestone diamond at T4 2006, labeled 31/12]																	
CEA Tuner																			
Design Piezo + Tuning System		[Gantt bar from T1 2004 to T3 2005]																	
Fabrication		[Gantt bar from T2 2005 to T4 2006]																	
Installation RF		[Gantt bar from T3 2005 to T1 2007]																	
MS Declare Ready for experiment!	Ready for experiment	[Milestone diamond at T1 2007, labeled 25/03]																	
IN2P3 Activity																			
Characterize actuators/piezo-sensors at low temperature		[Gantt bar from T4 2004 to T2 2005]																	
Test radiation hardness of piezo tuners		[Gantt bar from T1 2005 to T3 2006]																	
Integration of piezo and cold tuner		[Gantt bar from T2 2006 to T4 2007]																	
Cryostat tests		[Gantt bar from T3 2006 to T1 2008]																	
Tests with pulsed RF		[Gantt bar from T4 2007 to T2 2008]																	
MS Report on IN2P3 tuner activities	Status Report	[Milestone diamond at T2 2008, labeled 30/12]																	

WP 8 : tuners - WP 9 : Low Level RF

Typical Test on 2 weeks (LHe)



23 days for cavity handling ⇔ 9 working days for RF test

15 tests x 2 weeks

Planning

CARE proposal (CryHoLab displace before Tests)

N°	Nom de la tâche	2003				2004				2005			
		Tri 4	Tri 1	Tri 2	Tri 3	Tri 4	Tri 1	Tri 2	Tri 3	Tri 4	Tri 1	Tri 2	Tri 3
122	WP10:CRYOSTAT INTEGRATION TESTS												
123	10.1 Displace CRYHOLAB												
124	10.2 Integration tests in Cryostat												
125	Test 1												
126	Test 2												

Planning (WPs n° 7 – 8 & 10)

Preparation (cavity – cryogenic test – low power RF) : October 2004

CryHoLab displace : **Nov. 2004 ® April 2005**

Preparation (high power coupler - RF) : April 2005 →

1st series (Magnetostrictive & CEA tuners) : summer 2005 →

2nd series (IN2P3 activity – LAL coupler) : spring 2006 →

3rd series (INFN tuner) : autumn 2007 →

Planning (WPs n° 7 – 8 & 10)

Preparation (cavity – cryogenic test – low power RF) : October 2004

Preparation (high power coupler - RF) : → March 2005

1st series (Magnetostrictive & CEA tuners) : → summer 2005

CryHoLab displace : **Sept. 2005 ® Feb. 2006**

2nd series (IN2P3 piezo – LAL coupler) : spring 2006 →

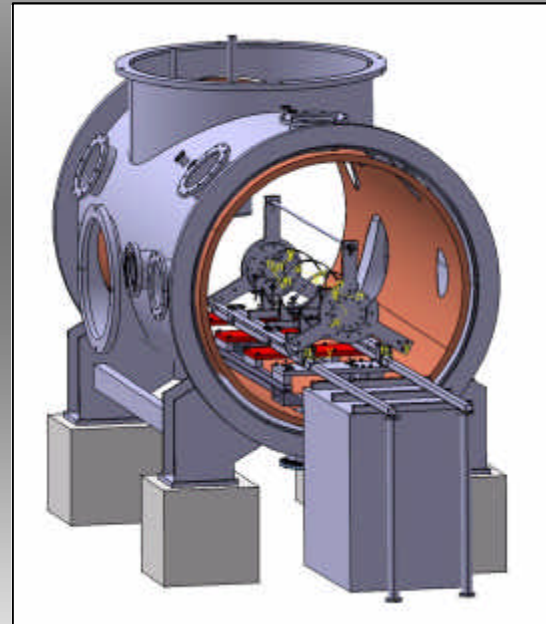
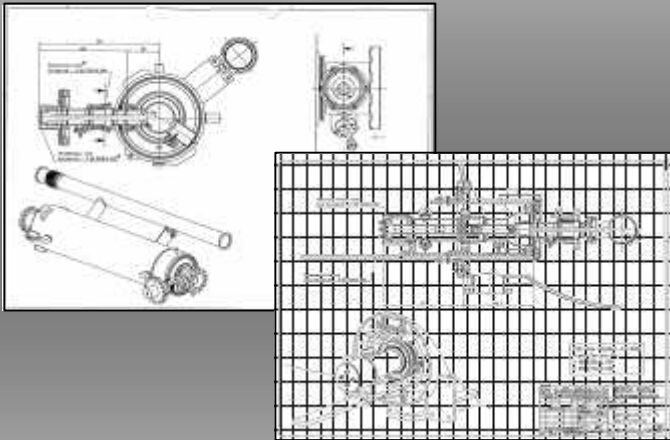
3rd series (INFN tuner) : autumn 2007 →

Delay

(declassification authorization – call for tenders)

Preliminary Tasks (before SRF tests)

- **Collect Drawings** from DESY (9-cell cavity and coupler)



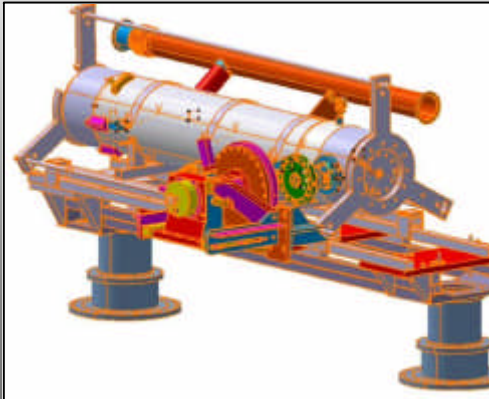
design and manufacturing

mechanical adaptations

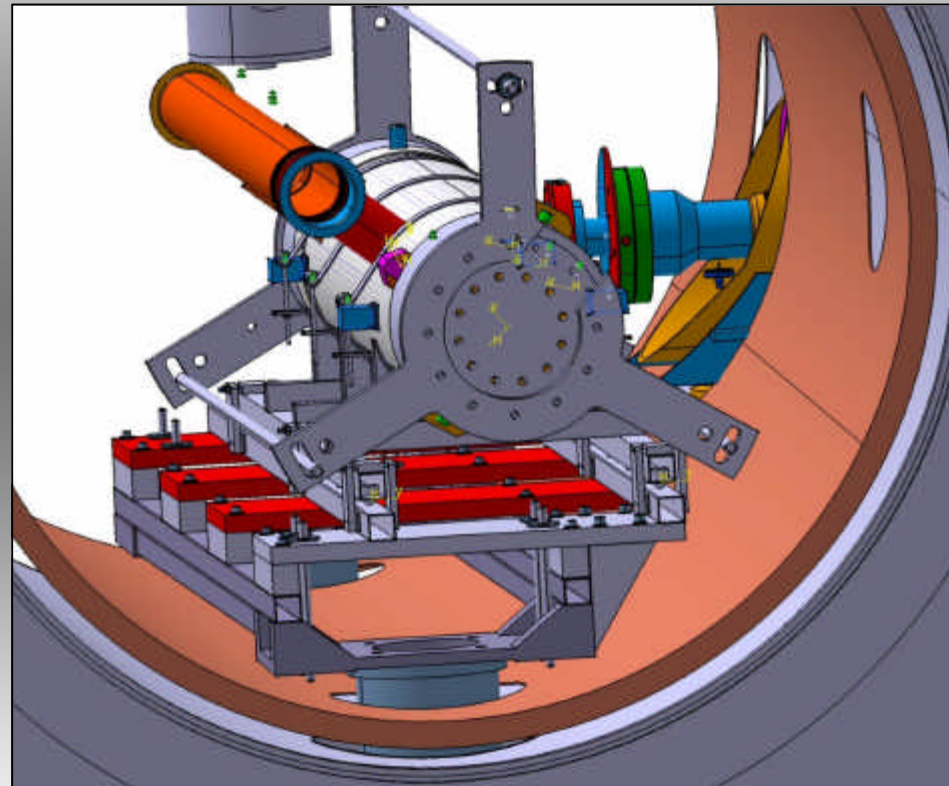
cavity handling (trolley) and support in CryHoLab

- **Design & manufacturing** (mechanical adaptations)

carried out



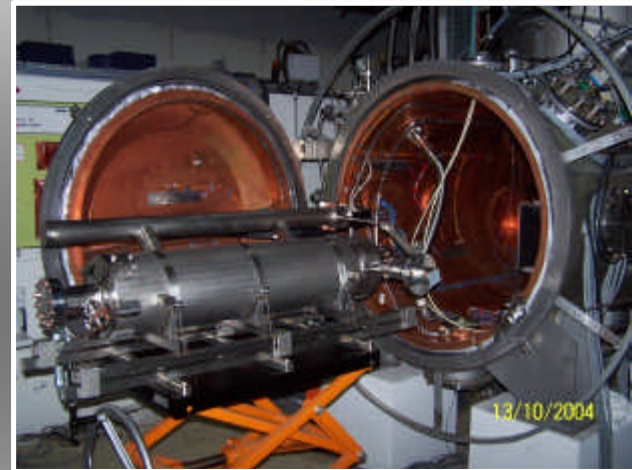
- Stiffness frame
(SS sheets + bracing rods)
- Support out of main axis
- Connecting flange
(coupler – CryHoLab)



- **Transfer 9-cell cavity** (C45 - 20 MV/m) from DESY
power coupler (TTF III) from LAL

- Checks before SRF Tests

- cavity assembly & handling
(HPR – clean room – transport by trolley – cryostat)
- cryogenic
(He tank filling – thermal sensors – insulating)
- RF test at low power



- **Next step** : 1.3 GHz RF power
(wave guide connection to CryHoLab)
- **Test at full RF power** (early 2005) : 1.5 MW - 10 Hz – 1 ms

Financial Part

Manpower & Financial Cost

- Helium (30 liter/hour x **12 days** x **15 tests**) 650 k€
with 5 €/liter as operating cost
- Men. Year contribution 3.8 M.Y

2004 estimates:

- Mechanical supports 9 k€
- Super-insulating material 3 k€
- Help from DESY (coupler assembly) 2-3 days
- Test for WP10 (cavity installation – 5 days He) 18 k€

Requested (EC support + Lab. Quote Part) [k€] for 2004 period, JRASRF WP10				
Tasks	Travel	Durable	manpower	consumables
Mechanical Adaptations		13	0.2 men. year	
Meetings ELAN+CARE	3.7			
Cryogenic Test (5 Days)			0.1 men. year	18 (Helium)

Requested (EC support + Lab. Quote Part) [k€] for the 2nd 18 month period, JRASRF WP10				
Tasks	Travel	Durable	manpower	consumables
Mechanics		20		
Meetings	4			
RF Tests (LP - HP) (2 Weeks)			0.27 men. year	43.2 (Helium)
Tests (4 Weeks) SAF + Piezzo			0.49 men. year	86.4 (Helium)