

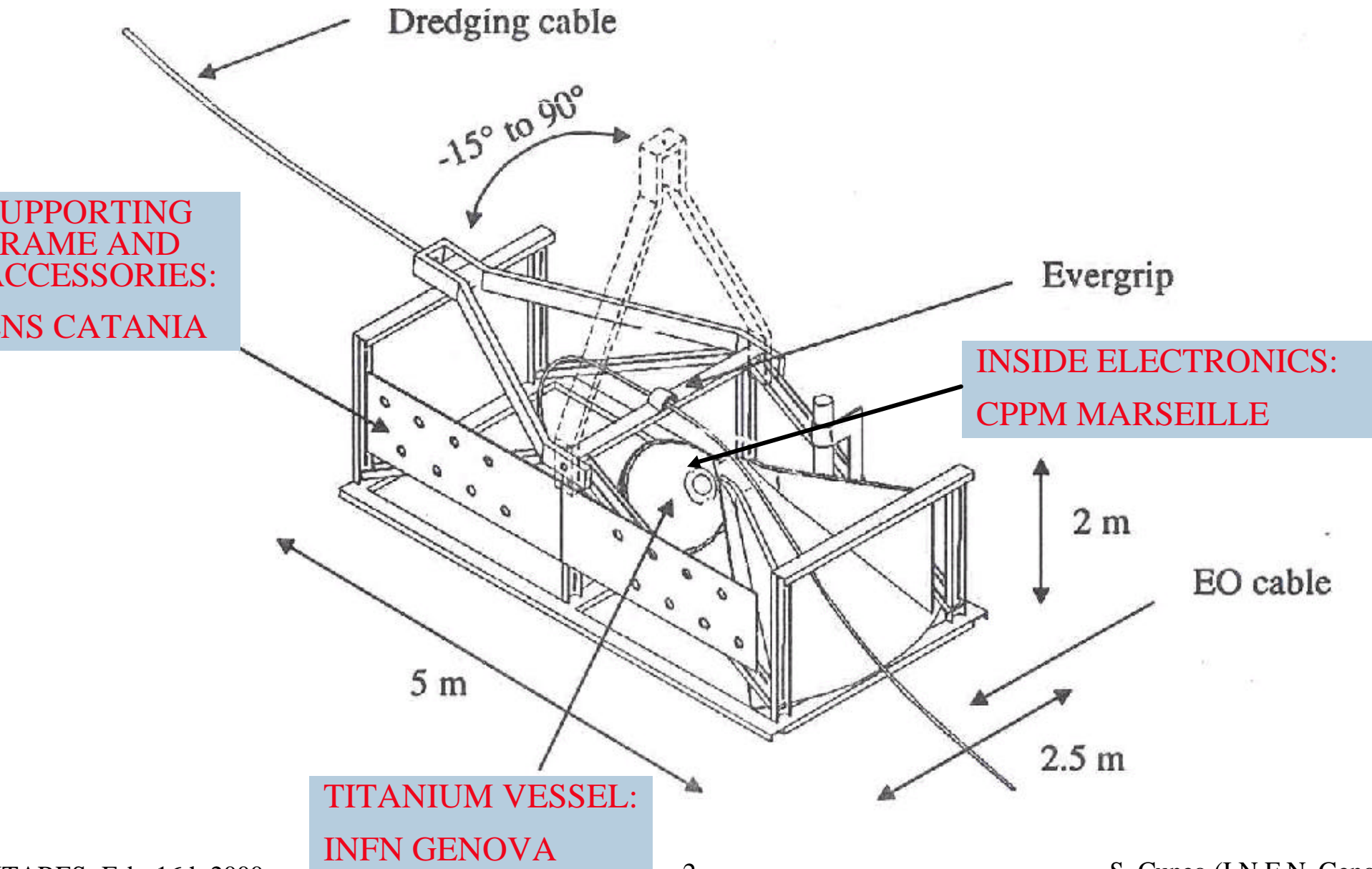
JUNCTION BOX & FRAME: STATUS & PLANNING

Nikhef, Feb. 16th 2000

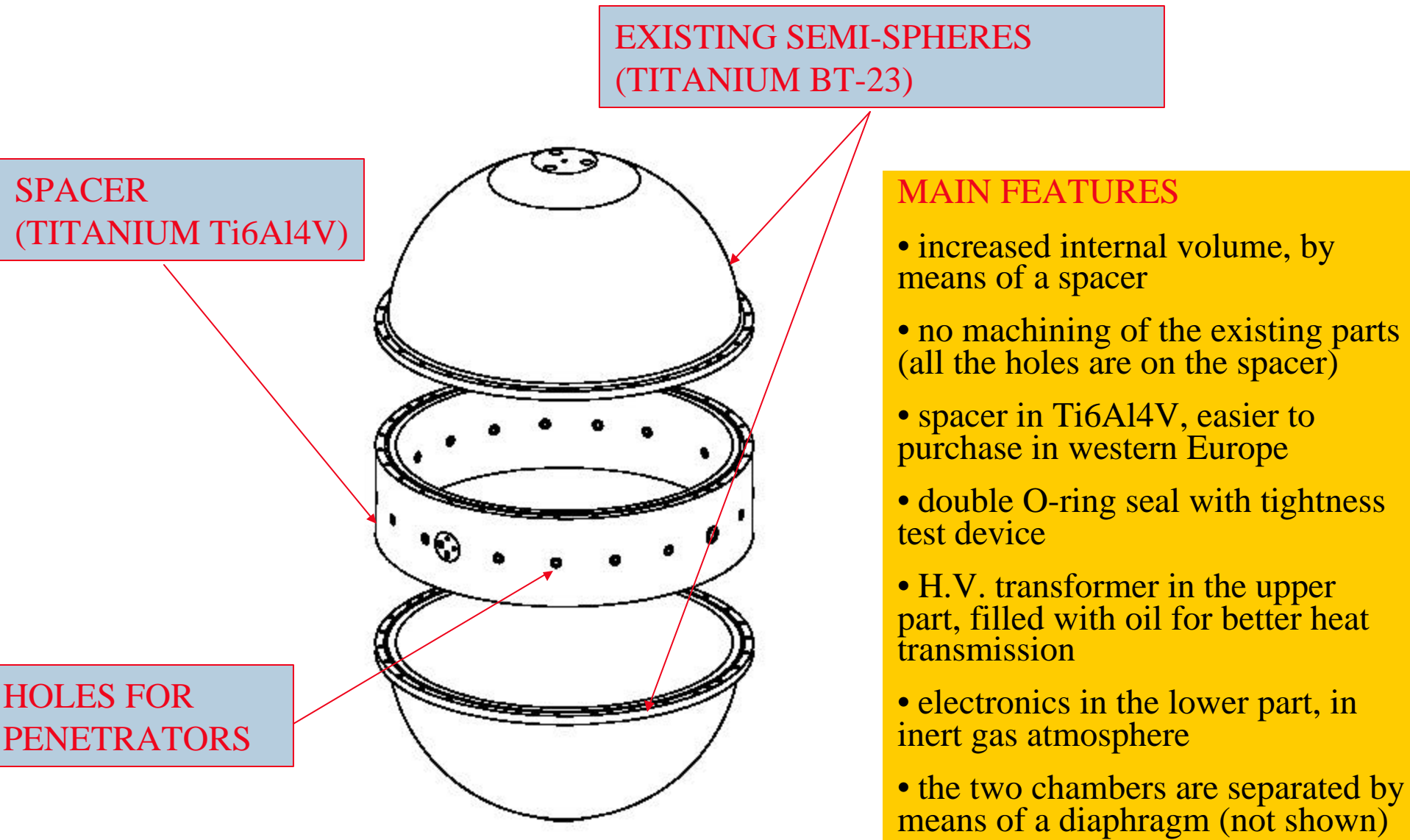
S. Cuneo

I.N.F.N. Genova

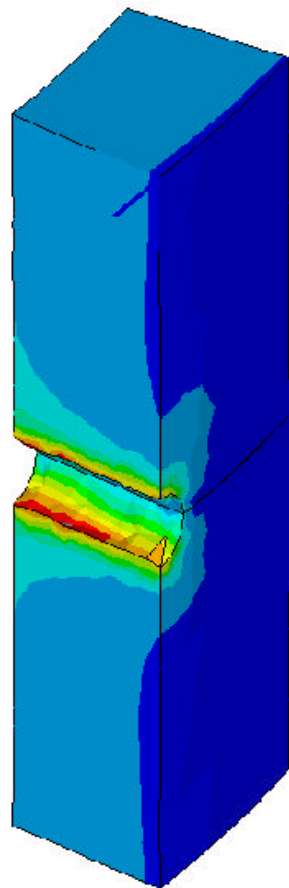
Sharing of responsibilities



Vessel: technical proposal



F.E.A. simulation: spacer



```
ANSYS 5.5.2  
JAN 14 2000  
12:26:28  
NODAL SOLUTION  
STEP=1  
SUB =1  
TIME=1  
SEQV (AVG)  
PowerGraphics  
EFACET=  
AVRES=Mat  
CMX =.001000  
SMN =.157E-09  
SMX =.618E-09  
.157E-09  
.208E-09  
.260E-09  
.311E-09  
.362E-09  
.413E-09  
.465E-09  
.516E-09  
.567E-09  
.618E-09
```

u. strutt. 3D dist. "pienc" - p = 310 bar

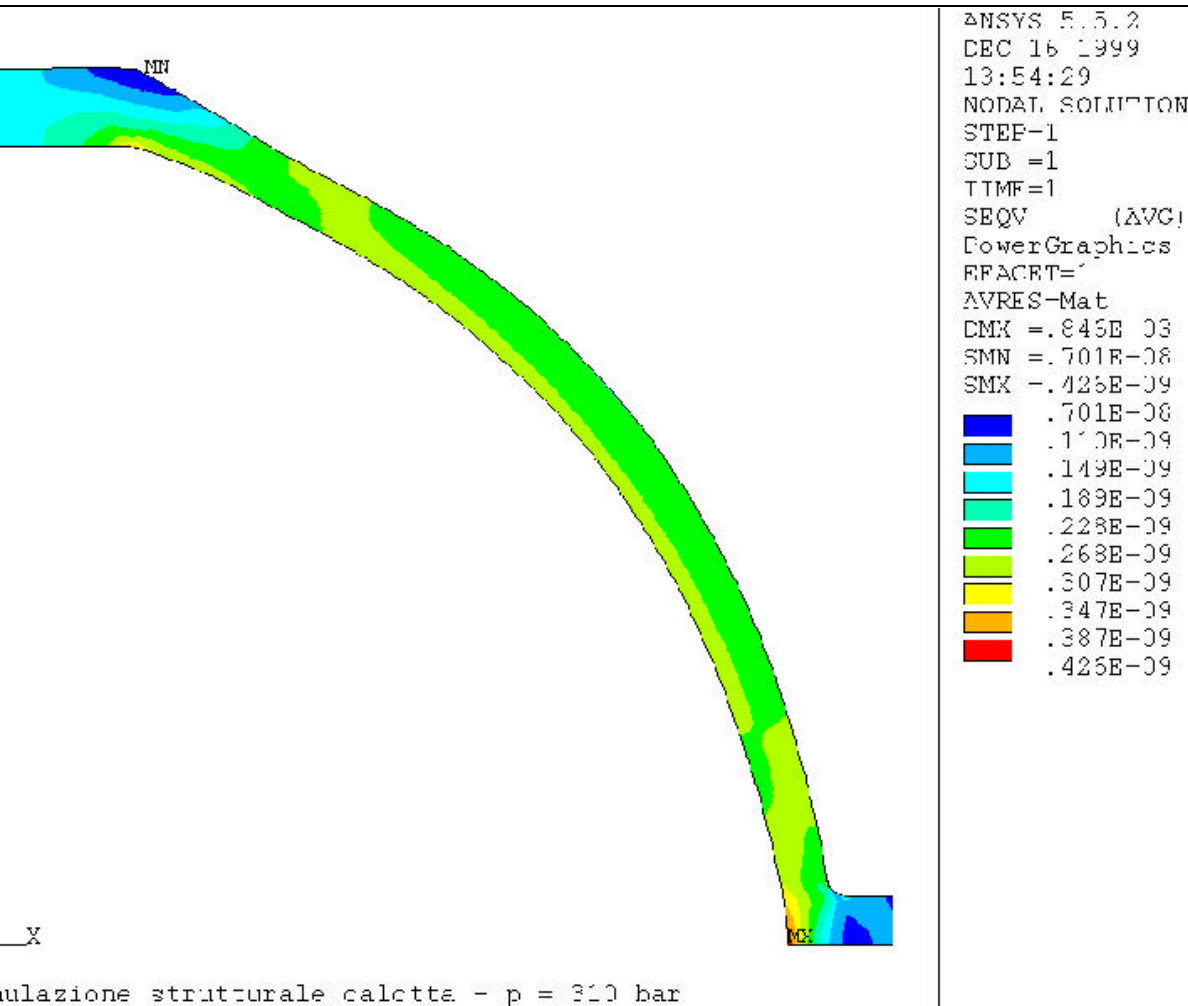
REMARKS

- simulation at test pressure of 310 bars (IFREMER specs)
- material: Ti6Al4V
- penetrator hole diameter: 13 mm
- max Von Mises's stress: 618 Mpa
- max allowable stress: 640 Mpa (safety factor = 1.3)

CONCLUSIONS

- the current design of the spacer should withstand the working (256 bars) and test pressures
- further investigation suggested, with buckling of the cylindrical shape (unavoidable geometrical imperfection)

F.E.A. simulation: semi-sphere



REMARKS

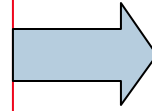
- simulation at test pressure of 310 bars (IFREMER specs)
- material: BT-23
- max Von Mises's stress: 426 Mpa
- max allowable stress: 740 Mpa (safety factor = 1.3)

CONCLUSIONS

- the current design of the sphere should withstand the working (256 bars) and tests pressure
- the simulation complies with the tested resistance of the sphere (720 bars, that corresponds to a Von Mises's stress of 989 Mpa)

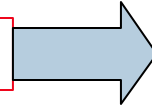
Open issues (vessel)

**ELECTRO-CHEMICAL UNAFFORDABLE
CORROSION BETWEEN BT-23 AND Ti6Al4
DURING 10 YEARS WORKING LIFE UNDER
THE SEA?**



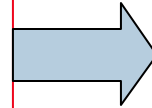
**DOESN'T SEEM SO - FURTHER TESTS
(ELECTRODE POTENTIAL) ARE IN
PROGRESS**

WHO CAN MANUFACTURE THE SPACER?



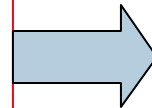
**SEVERAL SUPPLIERS CONTACTED -
SOME TENDERS ALREADY AVAILABLE**

**WHAT ABOUT THE THERMAL DISSIPATION
OF THE TRANSFORMER (1100 W OF HEAT
LOAD)?**



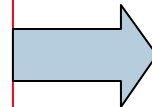
**THERMAL F.E.A. WILL BE SOON
PERFORMED**

**WHO CAN TEST THE VESSEL UNDER
PRESSURE?**



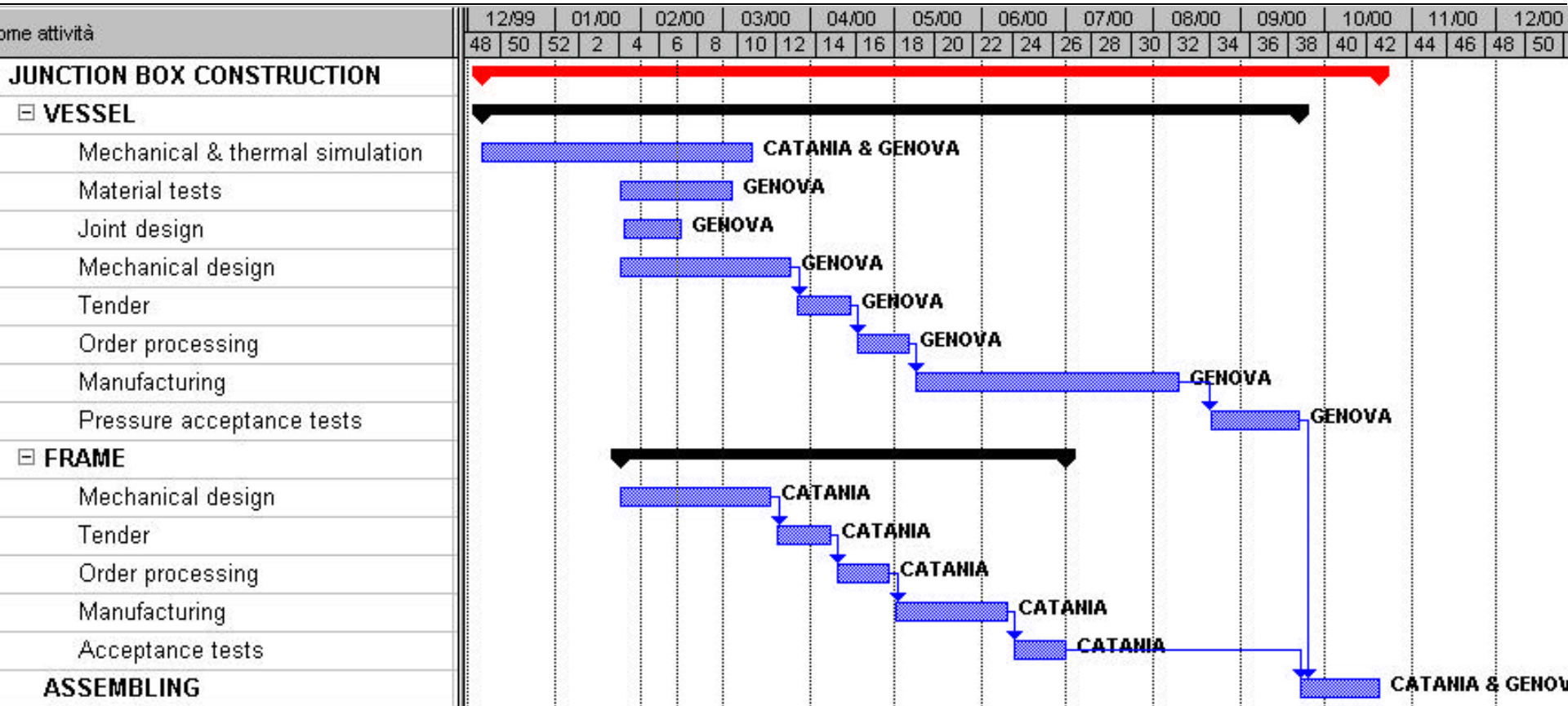
**KRYLOV SHIPBUILDING INSTITUTE IN
MOSCOW - BUT WE'RE LOOKING FOR
ALTERNATIVES**

**O-RING SEAL: MATERIAL, DIMENSIONS
AND SUPPLIER**



PROBLEM UNDER INVESTIGATION

Design and production planning



REMARKS:

several external suppliers involved

goal: assembly ready to be placed on site in **OCTOBER 2000**, when weather condition still allow open sea operation