

INFN Laboratories

Riccardo Papaleo

on behalf of TIAC

INFOR EAM

RESEARCH ORGANIZATIONS USER GROUP MEETING

INFN

Mission

The National Institute for Nuclear Physics (INFN) is the Italian research agency dedicated to the study of the fundamental constituents of matter and the laws that govern them

It conducts theoretical and experimental research in the fields of subnuclear, nuclear and astroparticle physics.

Fundamental research in these areas requires the use of cutting-edge technology and instruments, developed by the INFN at its own laboratories and in collaboration with industries.

Budget

INFN baseline budget for core activities around 265M€

TIAC

Technical Infrastructure Advisory Committee



Roberto Saban
TIAC coordinator



A. Zoccoli
Giunta INFN



#4 Lab Directors



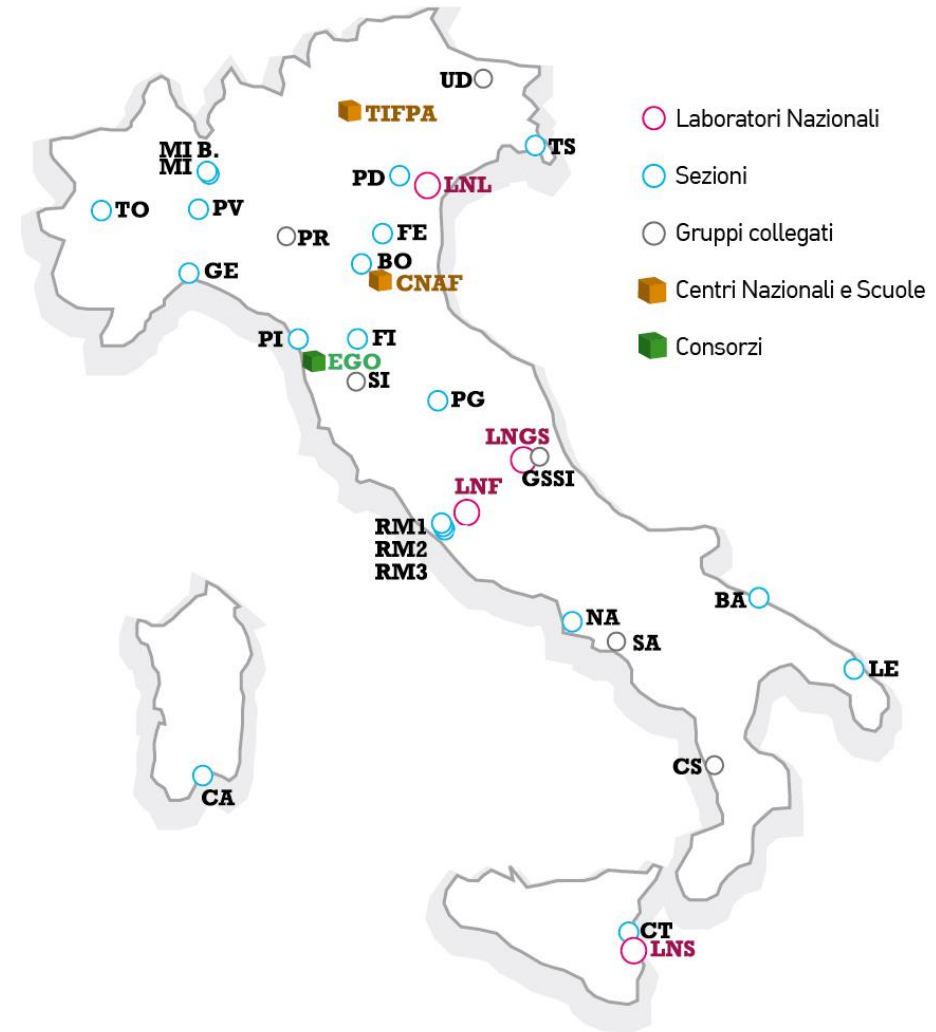
#4 Labs head of technical
division

Established in 2016

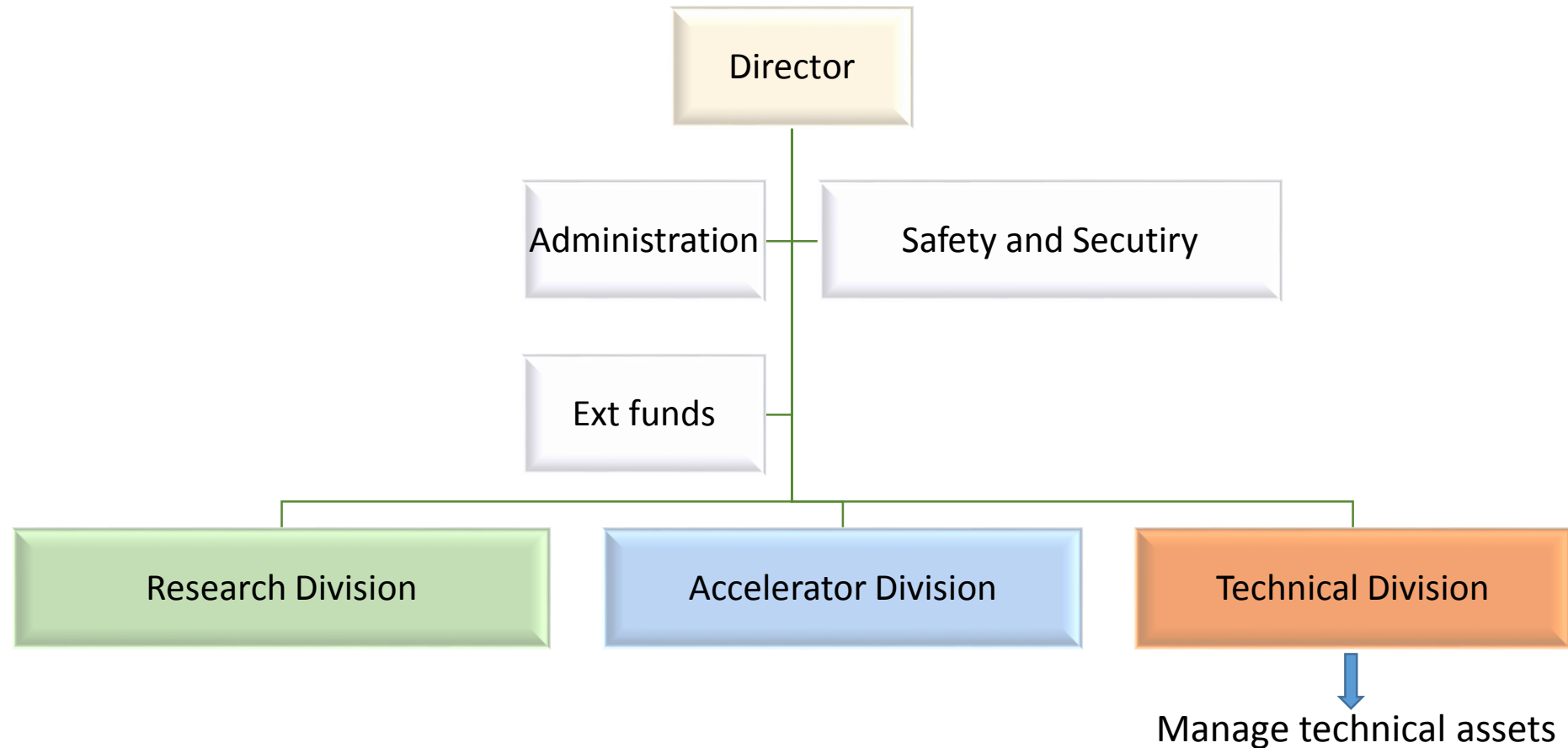
INFN Laboratories

4 National Laboratories

- LNL – Laboratori Nazionali di Legnaro
- LNGS – Laboratori Nazionali del Gran Sasso
- LNF – Laboratori Nazionali di Frascati
- LNS – Laboratori Nazionali del Sud



National Lab Organization structure



Laboratories Site architecture

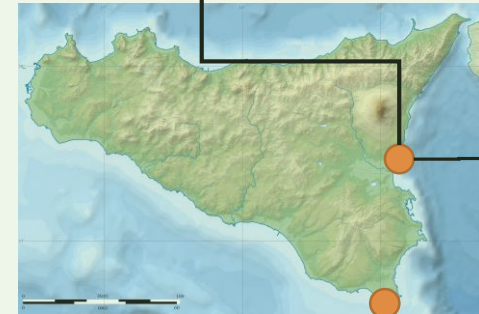
Multi buildings



Multi sites & buildings



Multi sites



LNL

Laboratori Nazionali di Legnaro

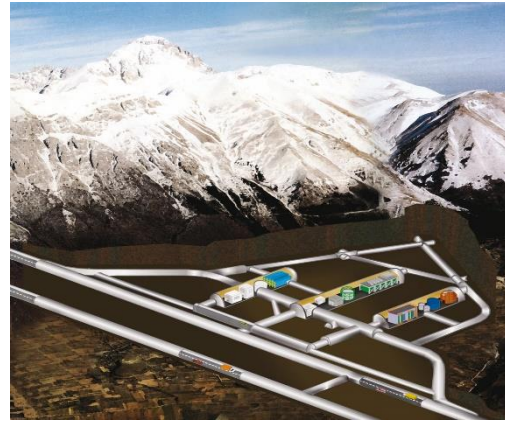


www.lnl.infn.it

30 Buildings	Area	Electrical Power	Heating capacity	Cooling capacity
Labs + offices	32.000 m ²	20MW	4.5MW	8.5 MW
Volume	175.000 m ³			
Technical Area	1.400 m ²			
Outside area (green, streets, ...)	195.000 m ²			

LNGS

Laboratori Nazionali del Gran Sasso



www.lngs.infn.it

Site	Area	Electrical Power	Heating capacity	Cooling capacity
Labs + offices	95.000 m ²	2.15MW	3.1MW	0.5MW
Volume	64.000 m ³			
Underground Lab	17.000 m ²			
Underground Lab (volume)	180.000 m ³			

LNF

Laboratori Nazionali di Frascati



www.lnf.infn.it

57 buildings	Area	Electrical Power	Heating capacity	Cooling capacity
Labs + offices	27.073 m ²	20MW	2.2 MW	17 MW
Volume	207.820 m ³			
Outside area (streets, ..)	16.692			

LNS

Laboratori Nazionali del Sud



www.lns.infn.it

Site	Area	Electrical Power	Heating capacity	Cooling capacity
Labs + offices	17.000 m ²	20 kV 2.63 MW	1.5 MW	6 MW
Meeting Area	2.200 m ²			
Test Site Laboratory	750 m ²	400 V 100 kW	100kW	100kW
Portopalo Laboratory (*)	980 m ²	20 kV 800 kW	430 kW	430 kW

Buildings and Area

Site	Building	Area (m2)
LNL	30	32.000
LNGS	15	95.000
LNF	57	27.063
LNS	3	20.930
	105	174.993

Industrial Plants Electrical

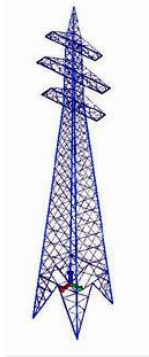
Battery or diesel rotary uninterruptible power supply (DRUPS) system

2 Laboratories

HV – MV – LV

2 Laboratories

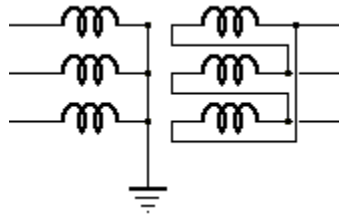
MV - LV



HV



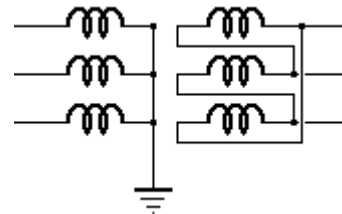
LNL – LNF



MV



LNS - LNGS



LV

Low voltage switchgears



Laboratories

Offices

Experimental rooms

Electrical plant

Site	HV-MV trafo	MV-LV trafo	UPS & DRUPS	Diesel generator		
LNL	26	75	15	8		
LNGS		25	27	6		
LNF		25	13	2		
LNS		12	2 (1200 kVA)	1		
Total	26	137	57	17		

Power and Methane consumption

	Electrical Power (2016) – kWh	Methane (mc)
LNL	15.380.014	51.247
LNGS	10.970.828	87.042
LNF	29.950.512	254.324
LNS	12.628.652	164.992

Cooling and heating system

LNL

Cooling capacity

Experimental rooms, labs, offices **7.3 MW**
#10 chillers -2000 m³/h H₂O

SPES

1.2 MW
#2 chillers

LNF

Cooling capacity

Experimental rooms, labs, offices **3 MW**
#240 Direct Expansion Air Conditioning Machine

#5 chillers
#2 dry coolers
#28 AHUs
#10 Cooling towers

#6 thermal power plant

LNGS

Cooling capacity

Labs and offices **3.1 MW**
#25 chillers

UNDERGROUND LAB

cooling power provided by the groundwater

LNS

Cooling capacity

Experimental rooms, labs, offices **6.1 MW**
#18 chillers
#3 AHU
#6 cooling towers

CATANIA HARBOUR LAB

Cooling capacity **250 kW**
#2 chillers

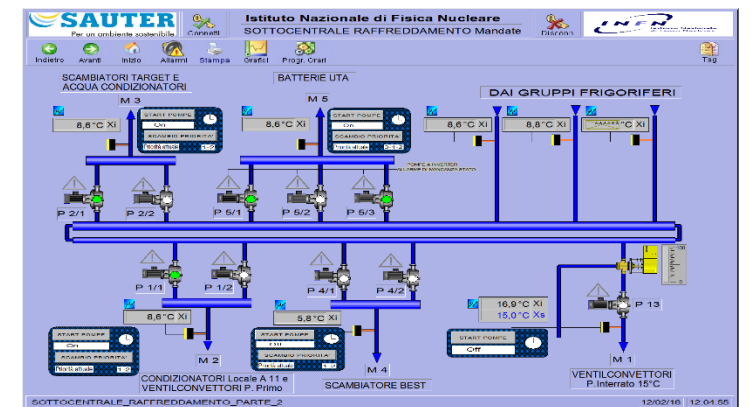
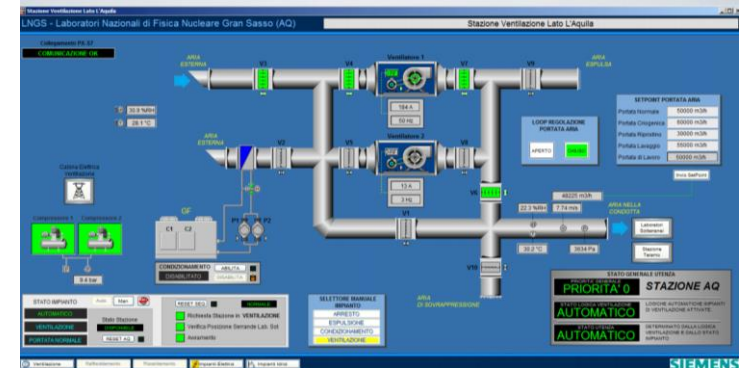
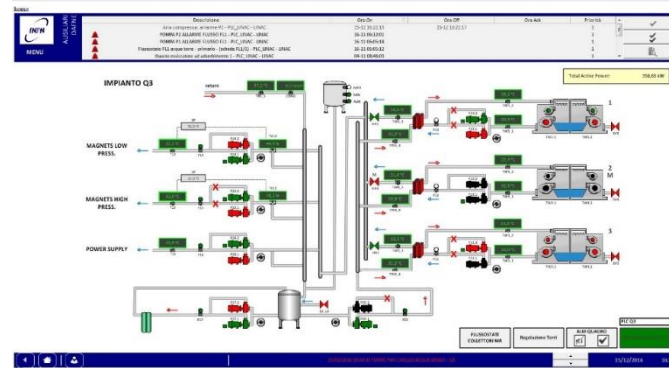
PORTOPALO LAB

Cooling capacity **500 kW**
#3 chillers
#1 AHU



SCADA

All Labs equipped with SCADA
... but different tools



Our goals

Standard platform (all National Laboratories)
for Enterprise Asset Management

EAM



manage the assets over their lifecycle to optimize the investments and to minimize risk.

Maintenance of assets it not a cost is an investment

Why

- Improve **safety and risk management**
- Reduce **downtime**
- **Manage the assets**
 - documentation
 - Cost control
 - Increase ... when possible, lifetime of the asset
- Improve **quality**
- Optimize the **outsourcing** (maintenance contract, ..)
- and minimize the **local heroes**

Thanks for your attention