Agenzia nazionale per le nuove tecnologie,
l'energia e lo sviluppo economico sostenibile

Le infrastrutture del PNRA

WORKSHOP PNRA

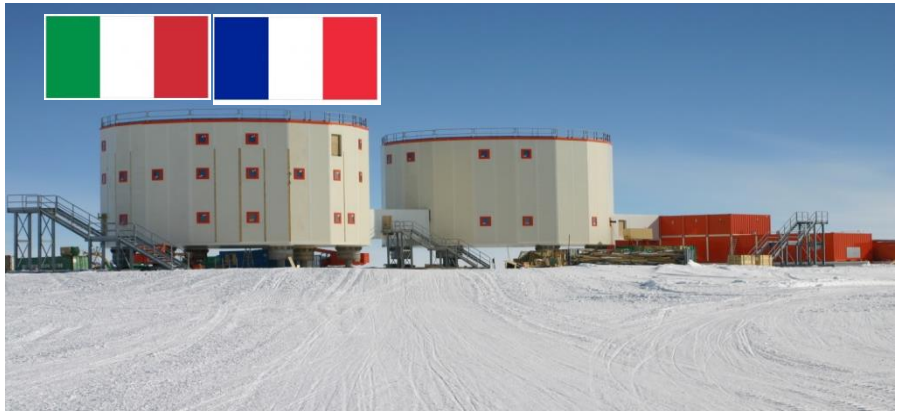
Teatro di Villa Torlonia, Roma - 05 dicembre 2023

Ing. Luigi Zucca – ENEA - Unità Tecnica Antartide

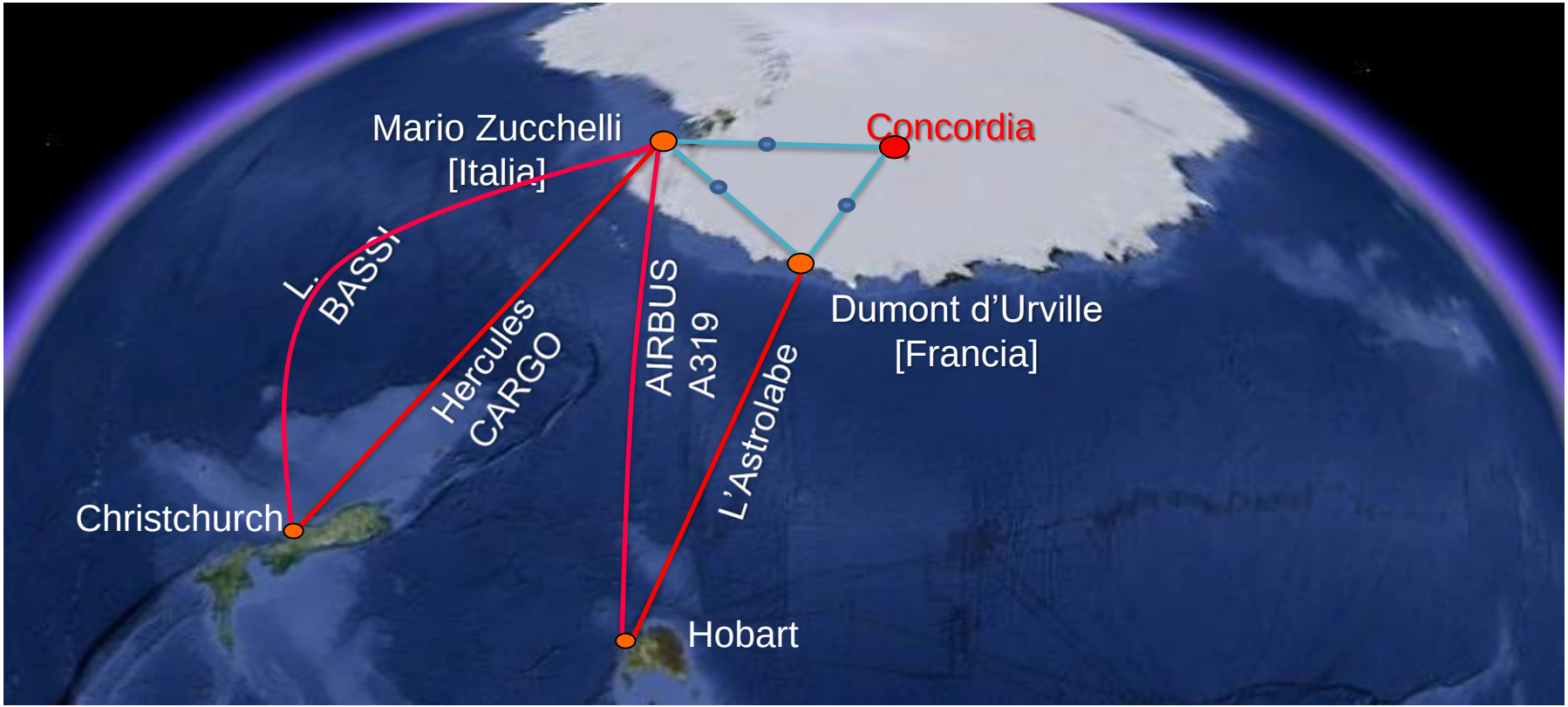
Antarctic Stations of IAP

Mario Zucchelli Station
Terra Nova Bay (Ross Sea)
Only Summer season
from mid October to mid February

Concordia Station
(in cooperation with France)
on the polar plateau at Dome C
Summer season and winter over
permanent Station



Antarctic Stations of IAP



Mario Zucchelli Station - Overview

Facilities: control room

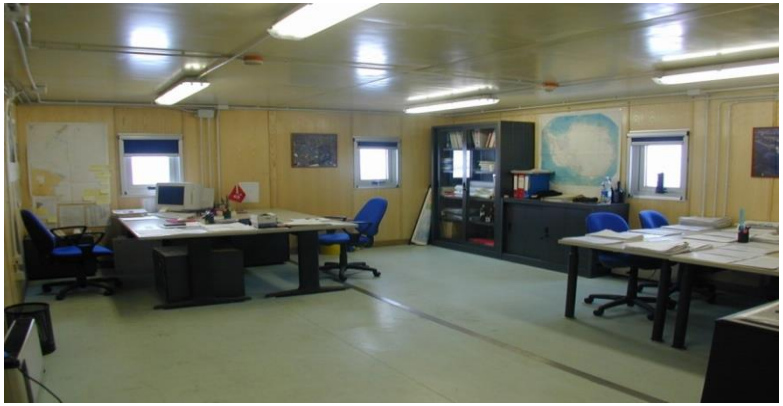
Radio communications systems:

N.2 x HF 1000 W
HF 400 W
INMARSAT
IRIDIUM
3 VHF (CH 28/82/6)
1 AVIO

Weather forecast office

WEATHER STATIONS DATA
CEILING DATA
NOAA – DMSP-METop- MODIS-NNPP (SATELLITE IMAGES)
METEREOLOGICAL SOUNDING

Facilities: offices Area



Facilities: Day zone

MZS facilities: canteen & bar (living zone)

- ***Canteen normal time***
  - Breakfast: from 7.00 am to 8.00 am
  - Lunch: from 1.00 pm to 2.00 pm
  - Dinner: from 7.45 pm to 8:45 pm

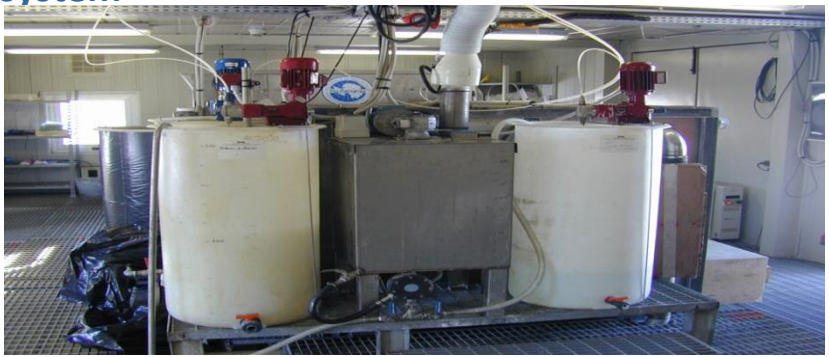
Bar

24hours

Plants

Combined heat power system (500 MWh/Y)

Desalination sea water plant reverse osmosis system (Max capacity of 28.000 lts/day)



Waste management

Renewable energies projects

- **N.3 wind generators (each 11 kW) operating in Off grid mode for winter load with automatic backup of Diesel generators.**

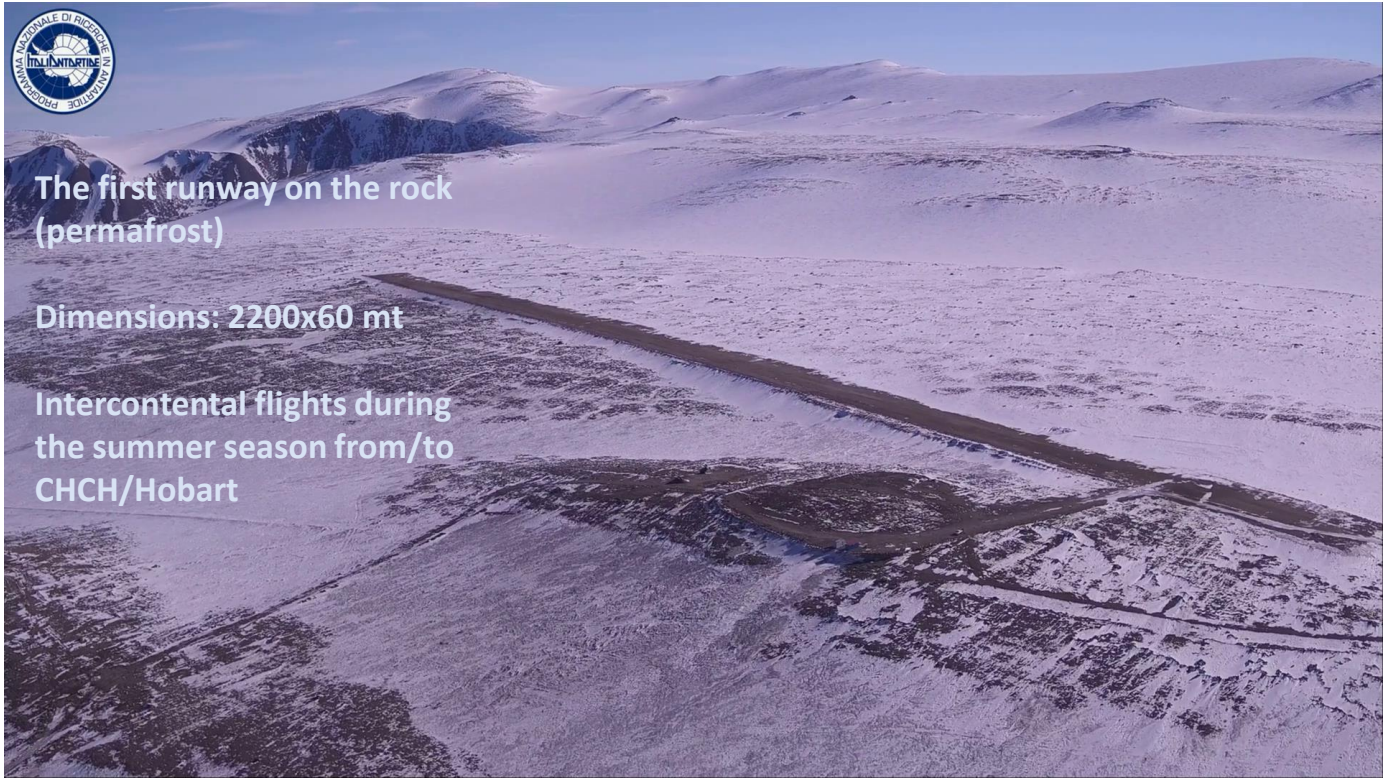
Runway at Tethys Bay

At the opening of the Station a temporary runway is made on the ice- pack for intercontinental flights from CHCH (October-November)

N° flight: 9-12 C 130 (cargo and passangers)

Runway dimensions:
Length: 3,000 meters
Width: 70 meters

New Boulder Clay runway



PNRA operations at Mario Zucchelli Station

The “Mario Zucchelli” Station is equipped with utility vehicles and with helicopters, two oceanographic vessels and rubber dinghis of various size for supporting research activities and logistic operations

Ground vehicles

Are available 42 ground vehicles (cranes, trucks, excavators) for engineering works and sites

Snow-ice vehicles

7 snow-cats
7 ski-doo
4 sledges
6 ski-doo sledges

Helicopters

Are available n.3 helipads and n.2 helicopters for logistic support to research activities for a total of 600-700 flight hours per year.

Air operations MZS-Concordia-DDU

Passengers or light cargo are transported by aircrafts chartered by the PNRA.

Sea vessels

1 marine research aluminium boat lenght 14,8 m (6 pax);

1 marine research steel boat lenght 13,8 m (6 pax);

2 outboard rubber boat

Loading and unloading of the Ship

on the ice-pack

by the sea

Concordia Station

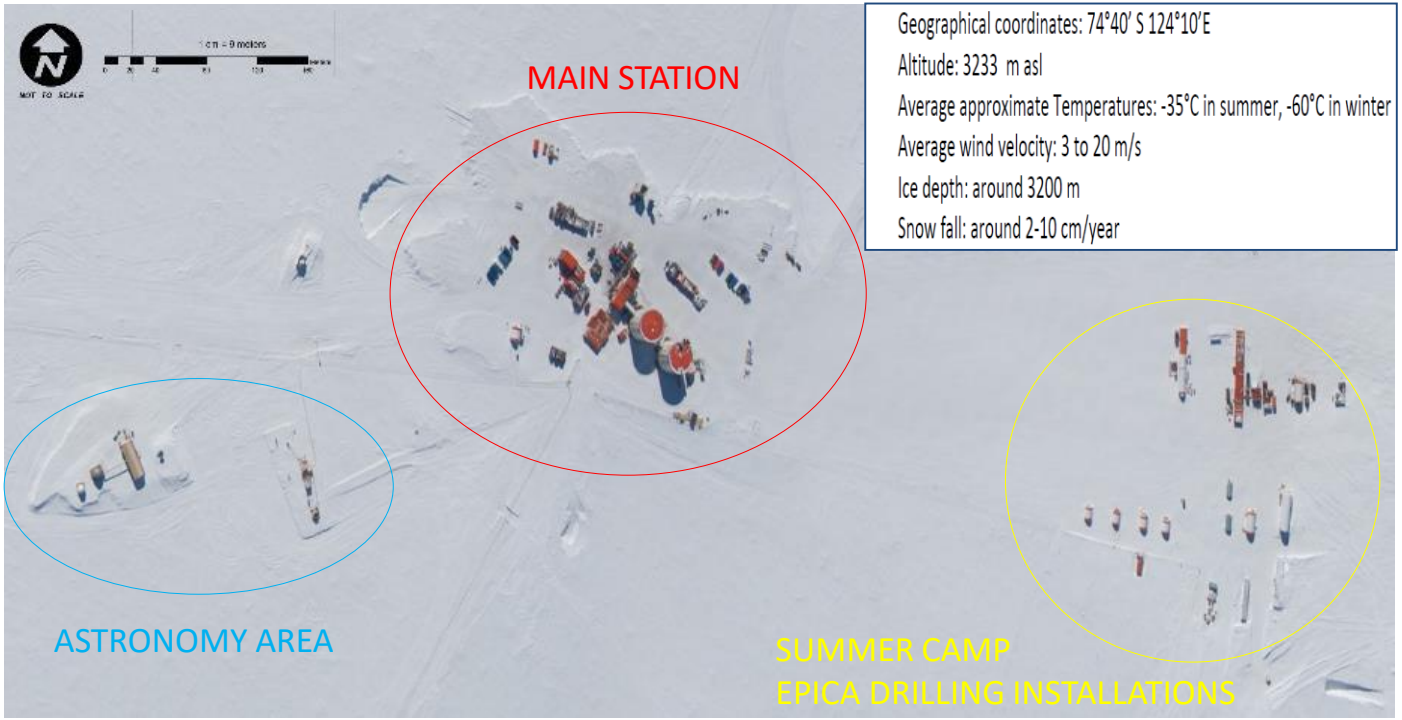
- Concordia Station is the French-Italian international Station co-managed by PNRA and IPEV.
- 1993 was signed ENEA-IPEV Agreement for the Construction
- 1999-2005 Construction of Concordia

Concordia Station is located 75°06' S, 123°21' E on the polar plateau at Dome C an altitude of 3233 m above sea-level, at 1100 km from the French Station Dumond D'Urville and 1200 km from MZS.

The site was selected in order to allow the international scientific community to conduct unique research in the field of glaciology, space, atmospheric, earth and life sciences, and remote sensing and because it is an excellent site for deep ice drilling

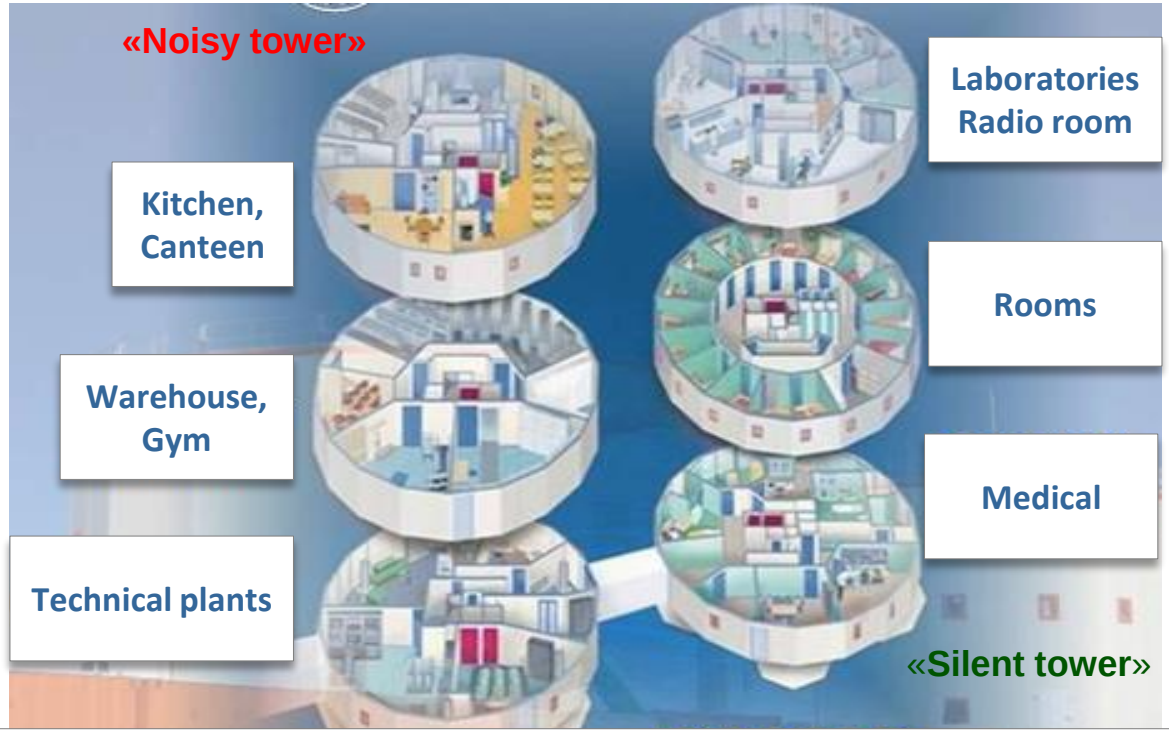
Concordia Station can accommodate up to 94 people in summer, 18 people during the winter.

Concordia Station: Overview



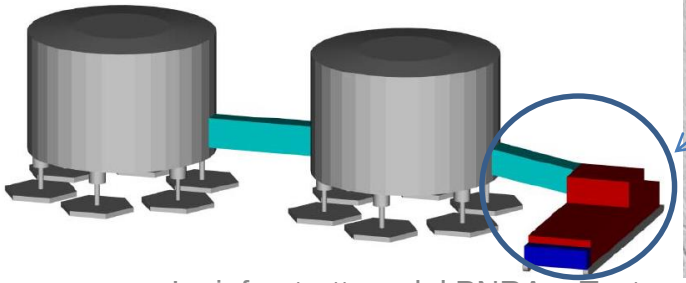
Geographical coordinates: 74°40' S 124°10'E
Altitude: 3233 m asl
Average approximate Temperatures: -35°C in summer, -60°C in winter
Average wind velocity: 3 to 20 m/s
Ice depth: around 3200 m
Snow fall: around 2-10 cm/year

Concordia Station: main buildings overview



The Station is made up of two polygonal buildings (with 18 sides) linked by a walkway. Each building incorporates three floors for a total surface of 1500 m^2.

Concordia Station: plants



The powerhouse is in a third, modular building mounted on skis. It is composed of nine modules on a first level and two modules on a second level. It is separated to avoid fire hazard of main buildings

Concordia Station: Water production

Storage in insulated and heated 20 m^3 tanks

Concordia Station: Grey water recycling

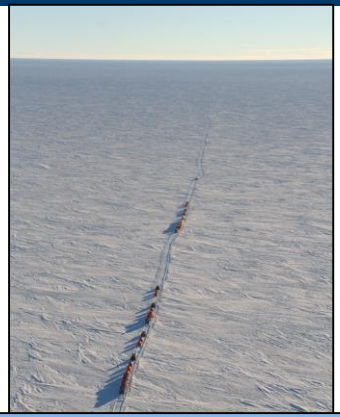
WATER RECYLING to decrease the needs of water production

- 3 steps of filtration (UF and 2 RO)
- Current rate : 85% to 90% of recycled water

Logistic support: Traverses/Raids

TRAVERSES from the coast (Dumont d'Urville) to CONCORDIA

- 1150 km – 10 days of travel 1 way (Avg speed: 10 km/h)
- 8-10 tractors + 2 Kasbhorer snow cats
- Fuel, food, scientific and technical material
- 3 traverses each summer
- 150 to 200 tons of material delivered per traverse
- Fuel carried:100 m3



FUEL CONSUMPTION:
around 100 m3 SAB per TRAVERSE

Grazie dell’Attenzione