PRIMALUCE SPACE

# GROUND STATIONS
# FOR SSA AND SPACE COMMUNICATION

**Advanced. Easy-to-use. Made in Italy.**

*CATALOG 2025*

PRIMALUCE LAB

**PrimaLuceSpace is the Space Division of PrimaLuceLab: we design and manufacture advanced yet easy-to-use optical and radio ground stations that support space communication and Space Situational Awareness (SSA) activities, enabling you to create or expand your ground segment faster and more efficiently than ever before.**

**Founded in 2013 in Italy, PrimaLuceLab pioneers ground-based technologies that enable the exploration of the Universe from Earth. By combining design, engineering, software development, and manufacturing all under one roof, we deliver fully integrated and intelligent solutions to space agencies, research institutions, universities, space companies, and the global astronomy community.**

*The company began at the Pordenone Science Center "Polo Tecnologico Alto Adriatico Andrea Galvani" and expanded in 2017 to a larger headquarters to support the development of large-scale instruments.*

***By integrating design, engineering, software, and manufacturing in-house, we deliver professional-grade solutions that make space exploration from Earth more accessible to space agencies, research institutions, universities, and the global astro-community.***


Located just north of the city of Pordenone (Italy) at the Polo Tecnologico Alto Adriatico technology center, the PL SPACE CENTER is an advanced astronomical observatory equipped with cutting-edge telescopes developed by PrimaLuceLab. This facility is designed not only for space research but also as a hub to inspire exploration of the universe by connecting groundbreaking technology with the public, educators, and companies worldwide.


# PL OBSERVATORY STATIONS

*OPTICAL GROUND STATIONS*

## WE EMPOWER RESEARCH AND THE SPACE ECONOMY WITH OUR INNOVATIVE AND AFFORDABLE OPTICAL GROUND STATIONS

PL Observatory Stations are complete systems composed by computerised telescopes, cameras, imaging accessories and domes designed to be automated and remotely controlled.

PL Observatory Stations are designed for several applications: Remote Satellite Imaging, Space Situational Awareness (SSA), Space Surveillance and Tracking (SST), Laser Communication, Scientific research & education, Astrophotography, Solar Activity Monitoring, Photometry, Spectroscopy and more. PL Observatory Stations are designed to cater to a wide range of astronomical and space applications and are available in various models to suit different needs and budgets.

They can accommodate various telescope dimensions, specifications and configurations, whether you need a compact setup for a single telescope or a larger structure for multiple instruments, based on the application you want to accomplish. By offering a range of customisable options, we ensure that our PL Observatory Stations meet the diverse needs of astronomers, researchers, institutions and businesses. Our goal is to provide a solution that is perfectly aligned with your goals, technical requirements, and budgetary constraints.

**PL OBSERVATORY STATIONS**

### key features

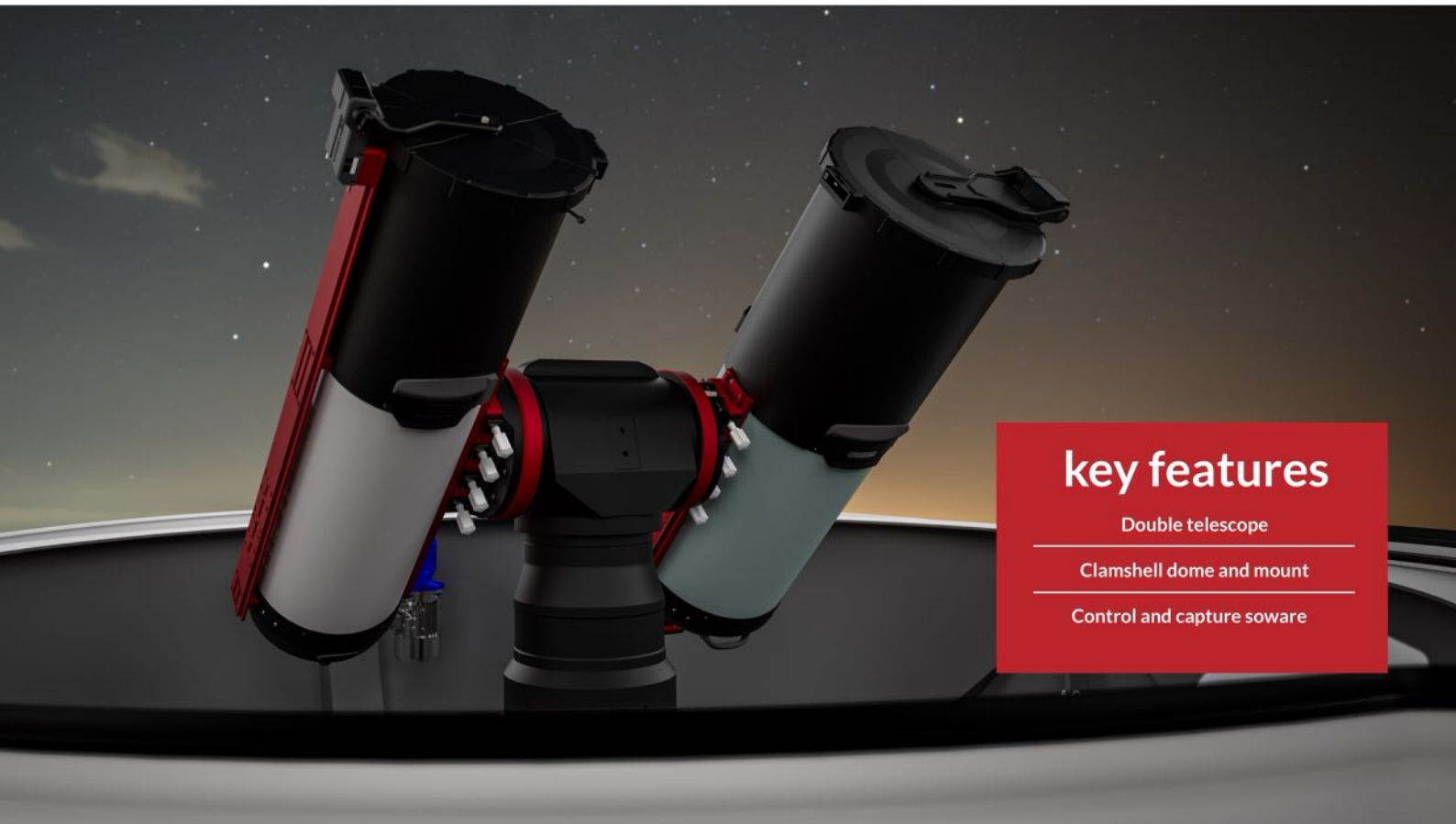
- Including telescope, mount, camera
- All-sky dome and accessories
- Control and capture software

# DUAL-PRO Observatory Station

*with double telescope and 3m dome*

**DUAL-PRO is the Observatory Station with double telescope and 3m dome designed to provide a professional level but compact solution that can be used for many applications: remote space exploration, space situational awareness, astrophotography and astronomy education/outreach.**

DUAL-PRO includes a very high precision and load capacity alt-az mount with heavy pier that supports 2 telescopes in parallel: a wide field telescope and a higher magnification one, both with robotic focusers, ARCO rotators, GIOTTO flat field generators and ALTO telescope cover motors. Every telescope comes with a special camera, this way the user is able to take pictures of the same object at different magnifications.



# BINO-SSA Observatory Station

*with binocular telescope and 3m dome*

**BINO-SSA is a turn-key and affordable Observatory Station with dual optical telescope that provide a large field of view for Space Situational Awareness (SSA) and Space Surveillance and Tracking (SST) activities like the study of space debris and its classification. A modern use of optical telescopes is to create a network of optical systems with large field of view for surveying and tracking space debris population. Thanks to its particular design, BINO-SSA (that includes 2 telescopes with cameras providing a large and customisable field of view – in the picture TI 35 by Telescopi Italiani) can be used for astronomy applications too.**

The telescope is provided with high slew speed, a precision computerized mount and a fully opening dome by offering the best solution for tracking satellites, space debris or quick sky surveys. This Observatory Station is optimized for LEO, GEO and MEO survey operations and the imaging train, composed of cameras and filter wheels with filters for different bands, is able to study potential different object's albedos.

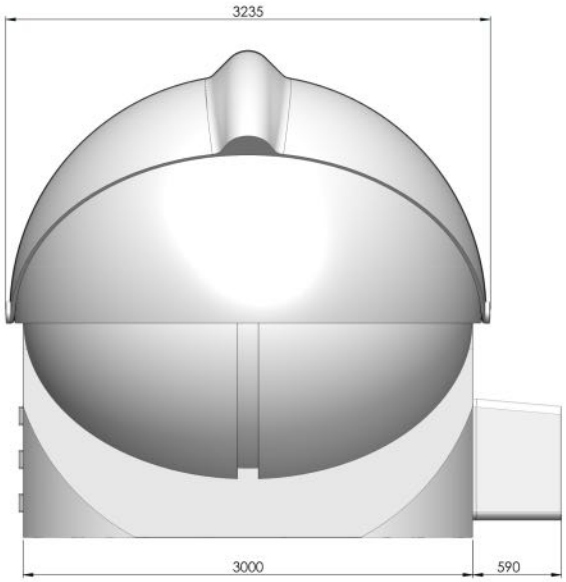
## key features

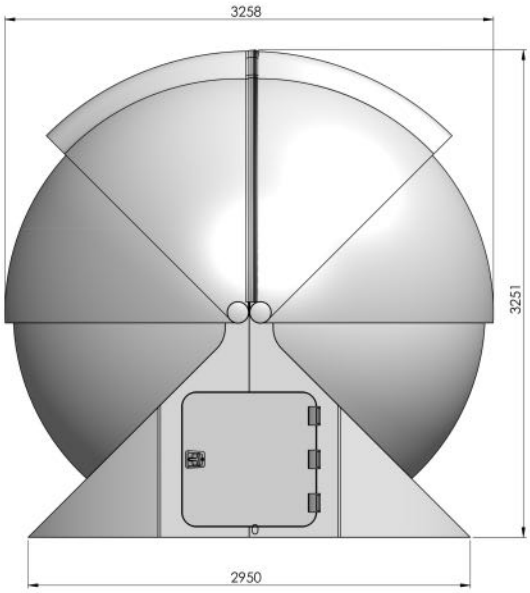
- Binocular telescope
- Clamshell dome and mount
- Compatible with SSA software

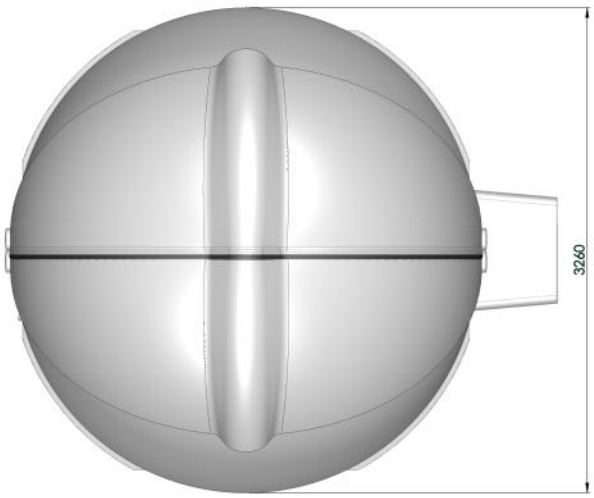
# OUTPOST 3M - Computerized clamshell dome

*for telescopes and space monitoring*

**OUTPOST 3M is a fully opening, 3-meter diameter computerized dome designed by PrimaLuceLab for telescopes and space applications. Unlike traditional observatory domes that require synchronization between the telescope and the dome shutter, OUTPOST 3M opens completely, giving telescopes unrestricted access to the entire sky. This makes it the ideal solution not only for astronomical observatories but also for fast-response tasks such as satellite tracking, space debris monitoring, and all-sky surveys.**




Constructed with a multi-layer GRP (Glass Reinforced Plastic) structure and featuring anodized aluminum and stainless steel components, the OUTPOST 3M delivers enhanced rigidity and durability, ensuring long-term stability even in the most demanding environments. High-speed motors and advanced remote-control electronics guarantee rapid opening and closing, while a selective shutter mode allows partial opening to protect the telescope from strong winds without sacrificing visibility.

# INTREPID
*RADIO GROUND STATIONS*

## NOW YOU CAN EASILY OWN AND OPERATE YOUR RADIO GROUND SEGMENT FOR SPACE COMMUNICATION, FOR AN INDEPENDENT ACCESS TO SPACE.

Developed through extensive research and engineering expertise, the INTREPID radio ground station are designed, assembled, and tested in Italy. These systems surpass conventional off-the-shelf antennas, by delivering superior tracking accuracy, sensitivity, and unparalleled engineering quality, all with a distinctive Italian design.

Furthermore, INTREPID radio ground stations are seamlessly integrated with the Radio2Space platform, that offers an advanced yet user-friendly interface for remote autonomous control. This platform allows users to manage operations via our software and cloud services, or to incorporate the INTREPID radio ground stations into existing Mission Control frameworks using our standardized APIs. This not only simplifies the operational workflow but also enhances the flexibility and scalability of space communication networks.

## INTREPID RADIO GROUND STATIONS

### key features

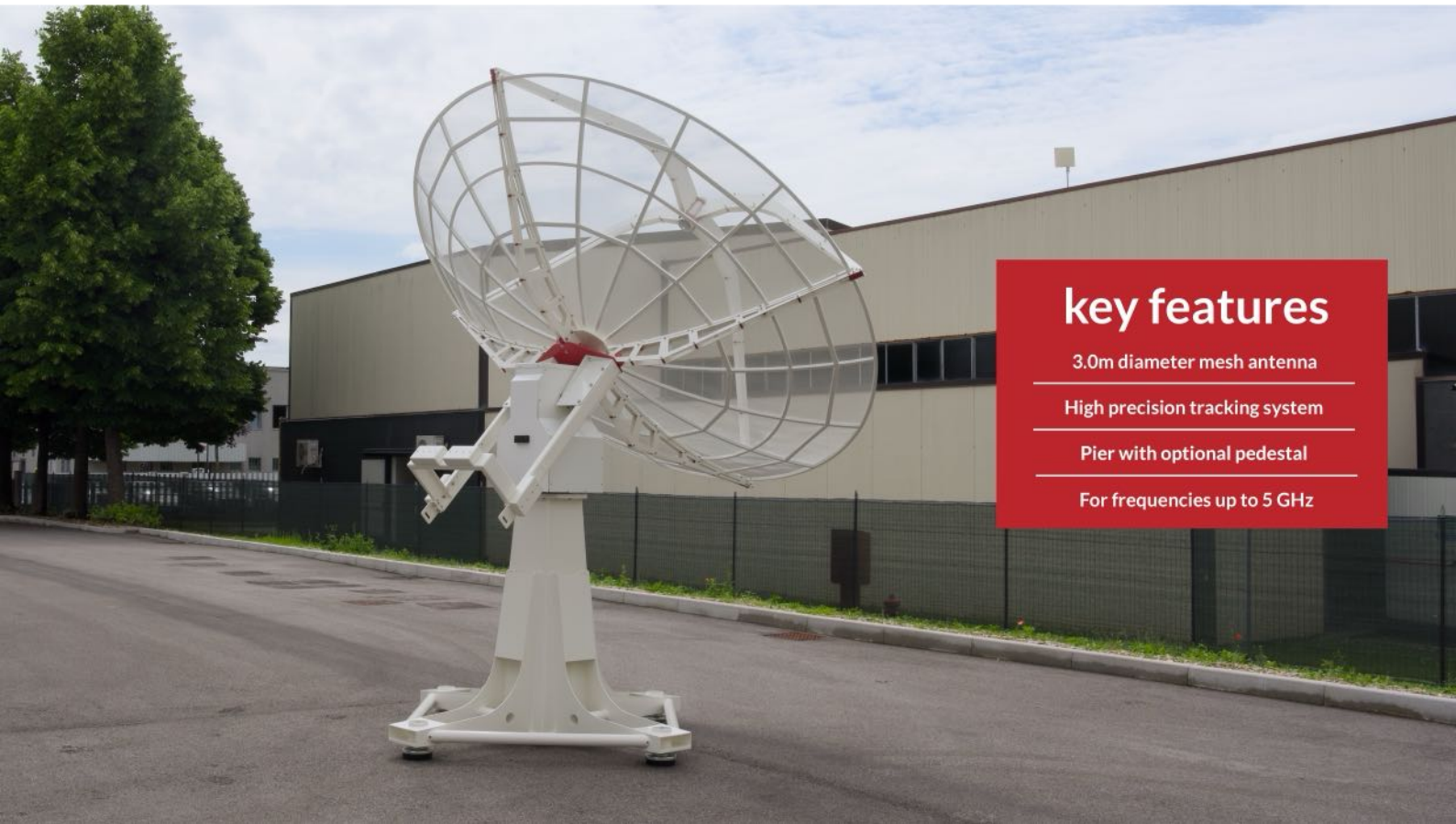
- Full dish parabolic antenna
- High speed (up to 19°/s) antenna tracking system
- High load capacity pier
- Optional S/X Dual-Band Coaxial Feed (LP, LCHP and RHCP)
- Provided with Radio2Space APIs
- Optional Radio2Space Workstation and Radio2Space Cloud software to remotely control

# INTREPID 300-5 3.0m ground station

*antenna system for L/S-band*

**INTREPID 300-5 is the compact and affordable ground station antenna system for L/S-Band that, by adding third party feed, LNA and receiver, provides very good performance at a cost that is compatible with a satellite mission on budget. Thanks to the provided developer documentation to integrate in Mission Control softwares, INTREPID ground station antenna system is capable of supporting a wide range of missions with very high flexibility of operations.**

INTREPID 300-5 is composed of 3 meter mesh dish antenna, high precision GS-100II antenna tracking system and C106-HEAVY pier for concrete base. Special design of the mount with high-torque motors, coupled with gear box, offers a perfect structure mechanical balance and a wind survival speed of 150 km/h.



# INTREPID 500-20 5.0m ground station

*antenna system for S/X/Ku/Ka-band*

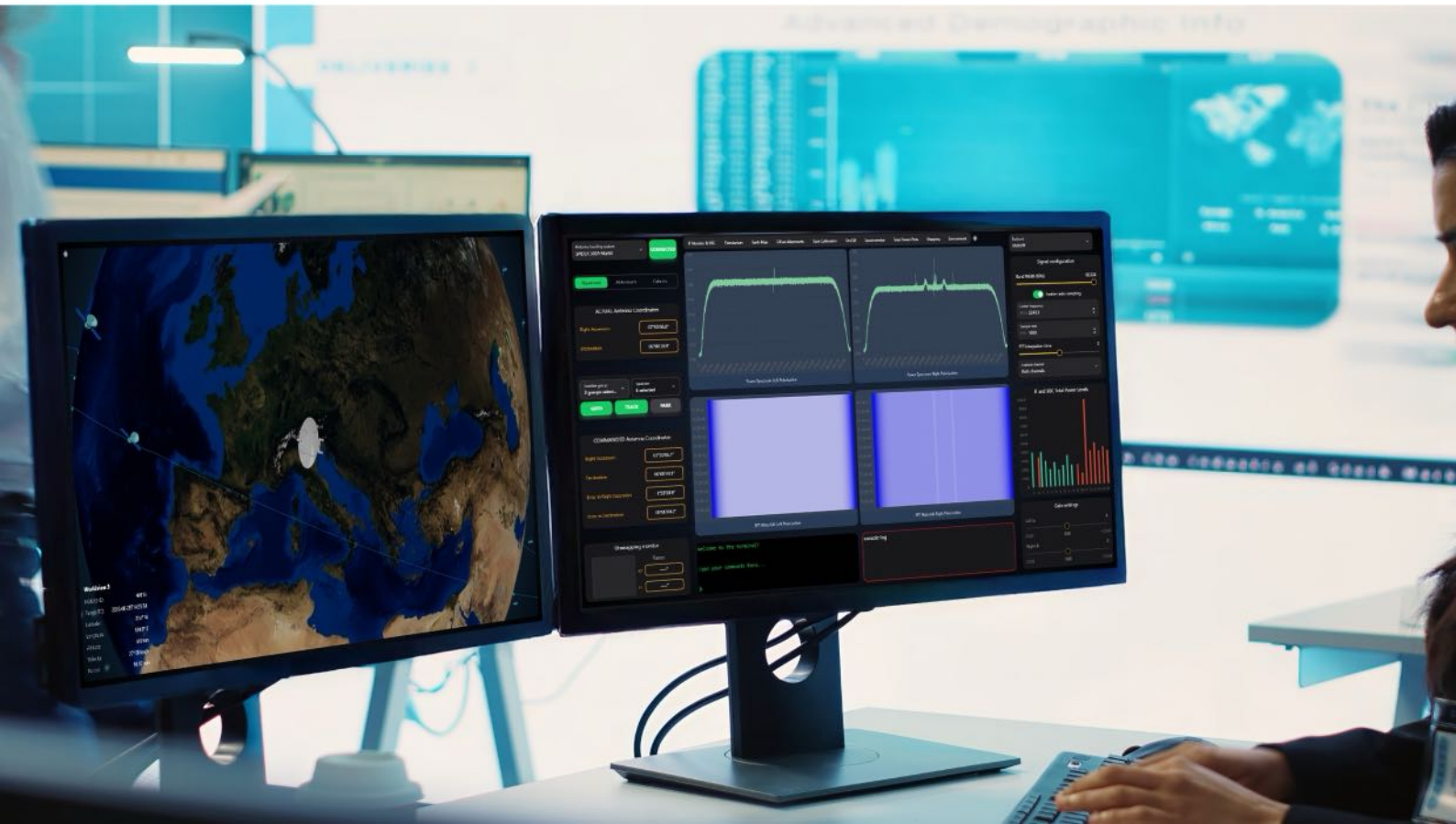
**INTREPID 500-20 is the new generation 5.0m ground station antenna system designed to revolutionize space communication applications since it provides advanced hardware features together with native integration with Radio2Space platform to let you easily create or expand your ground segment thanks to customizable APIs for easy integration, optional cloud services for remote management, and cross-platform software for direct control. This way academia, industry, research institutions or ground segment operators now have a ready-to-use solution to support LEO satellites and deep space missions.**

INTREPID 500-20 features a precise 5.0m solid dish antenna capable of recording frequencies up to 20 GHz, and GS-800II antenna tracking system with N-ACU Next generation Antenna Control Unit for high-precision tracking, remotely controlled with fast slew speeds (up to 19°/sec) and elevation axis flip to avoid any keyhole effect. INTREPID 500-20 can be used with third party frontends and backends or it can be equipped with S/X Dual-Band Coaxial Feed for L, LHC and RHC polarization.

# RADIO2SPACE WORKSTATION SOFTWARE
## *for INTREPID*

**Radio2Space Workstation is the multi platform application that enable users to control an INTREPID ground station directly from their computers. Designed with the end-user in mind, the software combines advanced functionality with ease of use, providing a comprehensive toolset for ground station management. Whether for academic, amateur, or professional use, the Radio2Space Workstation ensures that users have the necessary tools at their fingertips to manage and optimise their space communication operations effectively.**

- **Control of antenna tracking system**: Enables precise management of the antenna's movements to track satellites or celestial objects.
- **Object database**: Provides access to a comprehensive embedded catalog of celestial and orbital objects for easy tracking.
- **Positioning data visualization**: Displays real-time coordinates and movement of the antenna for enhanced monitoring.
- **Spectrum Analyzer**: Analyzes frequency spectra to identify and monitor signal strength and interference.
- **Real-time FFT waterfall**: Processes Fast Fourier Transform data live to visualize frequency components.
- **Radio receiver control**: Manages receiver settings for optimal signal acquisition and processing.
- **Acquisition settings**: Configures parameters for data collection, including frequency range, gain and bandwidth.
- **Planetarium viewer**: Displays a virtual sky for intuitive selection and tracking of astronomical targets.
- **Earth Map and Orbit projection**: Visualizes satellite orbits and ground coverage on a global map.
- **Offset Alignment procedure**: Adjusts antenna alignment for precise calibration relative to known reference points.
- **Automatic Gain Control**: Dynamically adjusts receiver gain to maintain consistent SNR.
- **Total Power Plots**: Displays power levels over time to monitor signal strength and fluctuations.
- **Automatic Mapping procedure**: Automates the process of creating radio maps.
- **Environment monitoring**: Tracks environmental conditions to ensure safe and efficient operation.



# OUR SERVICES

*CUSTOM SOLUTION DESIGN*
*WORLDWIDE SHIPMENT*
*PROFESSIONAL INSTALLATION*
*TRAINING ON-SITE*
*AFTER-SALE ASSISTANCE*

## Installation service

If you prefer, you can request optional on-site installation by our experienced staff. We will handle all assembly operations on top of the concrete base constructed by the customer according to plans provided in advance by us. Ground station installation and service is performed directly by us worldwide, based on a custom quote to be agreed upon before shipment of the ground station.

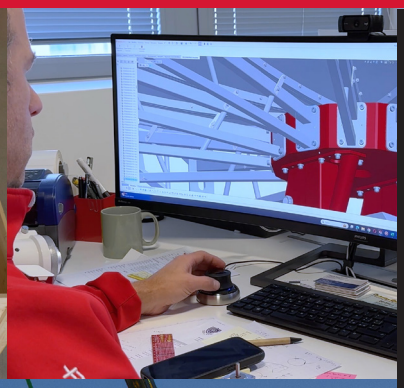
## Worldwide shipment

Our optical and radio ground stations are designed to be shipped around the world. Every ground station comes securely packed in a crate, designed for safe shipment of the instrument. Our ground stations are shipped partially assembled, requiring some assembly of the major components – an installation manual is included in the shipment.

**More than a ground station!**

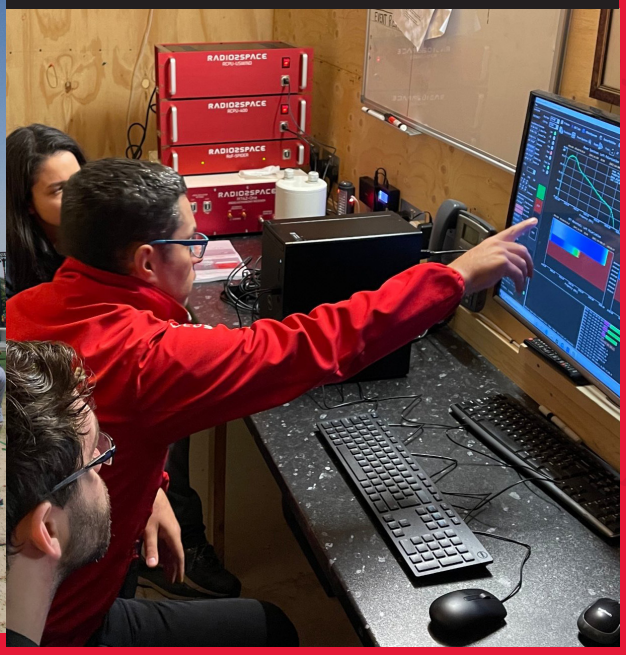
Our optical and radio ground stations provide an independent and affordable access to space so you can finally own and operate a ground station without the need to rely on do-it-yourself instruments!

Our ground stations are ready-to-use instruments already in use all around the world and our Installation Service can support you with shipment, installation and on-site training.



## On-site training

We also offer a training service after the ground station installation and subsequent functional tests. Our team will perform one or more days (based of a custom quote to be agreed before shipment of the ground station) of training and will introduce the use of instruments to the operators.



# OUR MISSION
# EXPLORE THE UNIVERSE FROM EARTH

Access to space has evolved from an exclusive domain to an open frontier, inviting commercial operators, researchers, and educators alike. However building a ground segment remains a challenge.

That's why we're reimagining GROUND STATIONS - creating innovative solutions that enable you to explore space independently and affordably, right from Earth.

Built to simplify and automate, our ground stations are engineered to be compact, user-friendly, and affordable making space exploration accessible for research centers, universities, museums, and private companies.

## Membership

PrimaLuceLab is a registered member of AIPAS (Association of Italian Space Enterprises) and AIR (Aerospace Innovation and Research), both of which bring together innovative Italian companies in the aerospace sector. Italy plays a significant role in the global space industry, serving as a valuable partner to major international space organizations.

PrimaLuceLab actively supports international projects and initiatives in astronomy and space applications, collaborating with educational and research institutions worldwide. Starting by 2015 PrimaLuceLab's products have been shown in the most important astronomy and space events like International Astronautical Congress, Meeting of American Astronomical Society, International Astronomical Union, SpaceCom and Space Tech Expo.

***www.primalucespace.com***

PRIMALUCE SPACE


PrimaLuceLab Headquarters.
Via Torricelli 9
33080, Porcia (PN)
ITALY

Email: space@primalucelab.com
Phone: +39 0434 1696106

PrimaLuceLab North America
4083 Oceanside Blvd.
Suite E Oceanside, CA 92057 USA
USA

Phone: +1 (442) -218 4507



PrimaLuceLab SpA - ITALY - VAT: IT01736450931