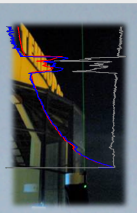
Performances analysis of a new powerful LIDAR configuration for 3D monitoring of tropospheric aerosols and clouds

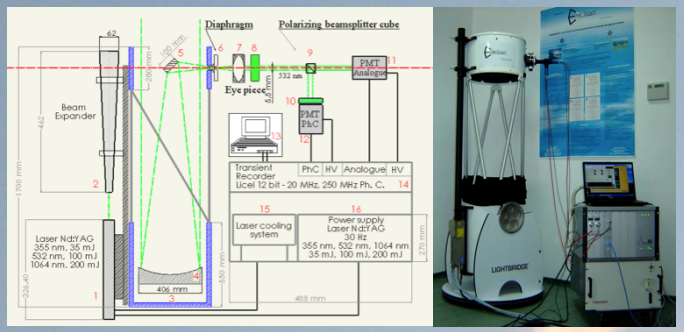
O.G. Tudose[1,3], M.M. Cazacu[1,3], A. Timofte[1,4], I. Balin[2,3], D. Nicolae[5]

(1) "Al. I. Cuza" University of Iasi, Faculty of Physics, 11 Carol I Blvd., 700506 Iasi, RO, (2) EnviroScopY SA, PSE - EPFL, Lausanne, CH,
(3) ESYRO (EnviroScopY SRL), Tehnopolis – Science & Technology Park, Iasi, RO, (4) Regional Forecast Center Bacău, 1 Cuza Voda Str., 600274 Bacău, RO
(5) National Institute of Research & Development for Optoelectronics, INOE, Bucharest - Măgurele, RO



ESYRO CONTACT : joan.balin@enviroscopy.com

the NEW ESYRO LIDAR system – basic configuration



Specifications of emission part (mESYLIDAR)	
Laser	**Nd:YAG**
Energy	35 mJ, 100 mJ, 200 mJ
Wavelength	355 nm, 532 nm, 1064 nm
Beam diamter	6 mm
Pulse width	6 – 9 ns
Divergence	0.75 mrad
Repetition rate	30 Hz
Beam Expander	
Expansion power	5X
Input aperture diameter	15 mm
Exit aperture diameter	48 mm

Specifications of detection part (mESYLIDAR)	
Telescope	Light Bridge
Type	Newtonian
Diameter of primary mirror	406 mm
Focal length	1829 mm
Focal ratio	f/4.5
Power	70X
The Detection	
Iris diaphragm	12 mm
Interferential filters	532 nm
Bandwidth	1 nm
Photomultipliers	Analogue, Photon Counting

1. Laser Nd:YAG
2. Beam Expander
3. Newtonian telescope
4. Primary mirror of telescope
5. Secondary mirror of telescope
6. Iris diaphragm
7. Eyepiece
8. Interferential filters
9. Polarizing beam splitter cube
10. Neutral density filter
11. Analogue Photomultiplier
12. Photon counting
13. Computer
14. Acquisition part, analogue/ digital conversion and datas transmitions
15. Cooling system for laser
16. Laser power supply

3 x ESYRO Lidar Stations in ROLINET

Iasi – UAIC: "Alexandru Ioan Cuza" University

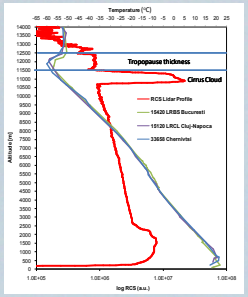
Cluj – UBB: "Babes-Bolyai" University

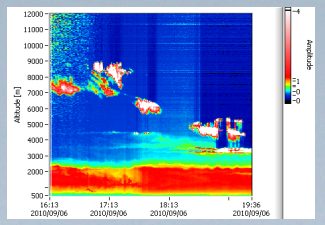
Timisoara – UPT: "Politehnica" University

ESYRO LIDAR Keywords

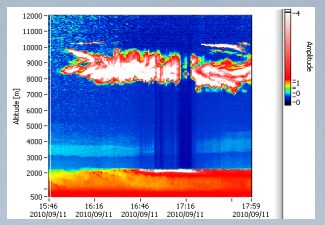
- **Low cost, easy up-gradable , versatile and modular;**
- **High spatial (m) and temporal (min) resolution and 3D scan;**

2nd of July 2009 - RCS night profile at 532 nm
h 20:18 UTC, 7.5 m spatial resolution, 5 min integration time & temperature profiles at h00:00 – 03.07.2009 from 3 near



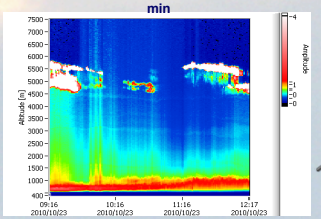


The example of RCS time series from 06.09.2010, at 355 nm – elastic UV channel, Spatial resolution: 7.5 m, Temporal resolution: 1 min
Location: at 2km from Rovinari Power Plant

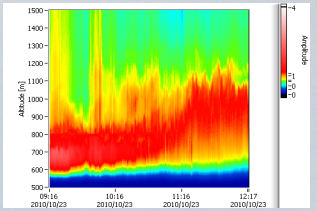


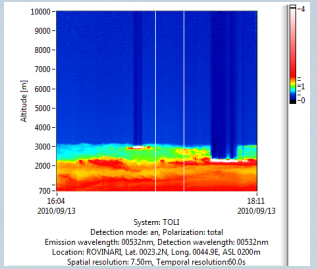
The example of RCS time series from 11.09.2010, at 532 nm – elastic VIS channel, Spatial resolution: 7.5 m, Temporal resolution: 1 min
Location: at 2km from Rovinari Power Plant

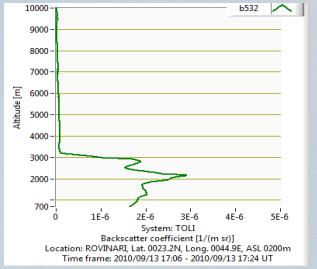
RCS time series from 23.10.2010 at 532 nm, elastic VIS channel, Cluj-Napoca - UBB site
Spatial resolution: 7.5 m, Temporal resolution: 1 min



Highlighting the evolution of the planetary boundary layer from 23.10.2010







ESYRO LIDAR APPLICATIONS

- **3D monitoring (clouds, aerosols, dust , volcanic ash, …)**
- **Planetary Boundary Layer (height, dynamics, structure, …)**
- **Aerosols characterization (optical coefficients, size…)**
- **Depolarization study (aerosols shape);**
- **Anti-hail and fight against fire and droughts complementary tool.**
- **Meteorological forecasting (i.e. using PBL altitude and cloud ceiling)**

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