

The World Space Observatory Project

WSO/UV http://wso.vilspa.esa.es/



I. Pagano¹-M. Rodono², G. Bonanno¹-L. Buson², A. Cassatella⁴, D. De Martino⁶, W. Wamsteker⁶, B. Shustov³, M. Barstow⁸, N. Brosch⁹, Cheng Fu-Zhen¹⁰, M. Dennefeld⁴, A. I. Gomez de Castro¹-2, N. Kappelmann^{1,3}, J. Sahade^{1,4}, K. Van der Hucht¹⁵, J.-E. Solheim¹⁶, H. Haubold², A. Altamore¹⁹, V. Andretta⁵, M. Badialf, U. Becciani¹-1, I. Bus a¹, E. Cappellaro⁵, D. Cardini⁴, S. Catalano¹, V. Castellano², M. Chiaberge²⁵, A. Chiefff, C. Chiuderi², R. Cosentino³, G. Costellano³, M. Taradorin³, A. Rack⁴, A. F. Lanza¹, A. Lanzafame², M.L. Malagnin³, E. Marilli ³, P. Marziani³, F. Marteucci⁴, C. Rossi⁸, S. Scuderi³, P. Selvelli⁴, R. Silvottf, L. Terranegra⁵, M. Turatto³, M. Uslenghi², R. Viottf⁴

1) INAFCatania, Italy 2) Univ. Catania, Italy 3) INAF-Padova, Italy 4) CNR/IASF-Roma, Italy 5) INAF-NA, Italy 6) ESA-Vilspa: 7) INASAN, Russia: 8) Univ. Leicester, UK: 9) Wise Obs., Israel: 10) USTC-CfA, China 11) IAP, France: 12) UCM, Spain: 13) Univ. Tübingen, Germany: 14) CONAE, Argentina: 15) Sron-HEA, Netherlands: 16) Troms o Univ., Norway: 17) UN-OOSA: 18) Univ. Roma 1, Italy: 19) Univ. Roma 3, Italy: 20) Univ. Florence, Italy: 21) Univ. Milano, Italy: 22) CNR/IASF-Milano, Italy: 23) INAF-Trieste, Italy: 24) Univ. Trieste, Italy: 25) CNR/IAS-Bologna, Italy: 26) ESA-STScl. USA: 27) Univ. Pisa, Italy: 29) Univ. Florence, Italy: 29) Univ. Florence, Italy: 29) Univ. Florence, Italy: 29) Univ. Florence, Italy: 20) Univ. Florence, Italy: 20

The Imaging

based on the Tauvex

imple the diffraction limited esolution. Additional imagers can

e allocated by using 90° single

2 high resolution UV

2 high sensitivity UV

2 optical imagers.

study for a polarimeter unit is in

Aperture velength RanSF Sampling FOV Photoca

0,85 ± 120 - 290 nm 0,9 ± 350 - 500 nm

cameras

rogress.

amera design is



Background



** ESA-CDF assessment study ESA/CDF-05(A)
 **http://wso.vilspa.esa.es/docs/WCC/DOC/Attachments/GENTN-0002-1-0.pdf

♦ A JPL/NASA assessment study ADP Report: CL#01-1168 http://wso.vilspa.esa.es/docs/WCC/DOC/Altachments/GENTN-0001-Draft-0.pdf (Gen 2001)

WSO/UV is an International Collaboration to build a UV (103-310 nm) dedicated telescope (1.7m) capable of:

- ✓ high resolution spectrosco

- √ free of visibility constraints (L2)
- √ "real time" operations
- ✓ investigate all possible time-scales

WSO/UV principia

- Use application innovation, but avoid technical innovation
- Use heritage as much as possible;
- Apply new engineering methods (concurrent design);
- Keep the mission simple;
- Science Operations Centers at National level.

Performances

Spectral resolution: WSO/UV-HIRDES ≈ HST-STIS

WSO/UV -HIRDES > HST -COS

Sensitivity: WSO/UV-HIRDES ≈ 5-10 × HST - STIS

WSO/UV-HIRDES ≈ HST-COS

WSO/UV has a high efficiency of observations at L2

WSO/UV will provide a net increase in UV productivity of a actor ~40-50 compared to HST/STIS

WSO/UV -HIRDES vs. HST-STIS

Science

 observe objects 4-5 magnitudes fainter than possible with HST. iding completely new opportunities in extragalactic astronomy and cosmology.

With a 2007/8 launch date, WSO is ideally placed to provide follow-up studies of the large number of UV sources expected from the GALEX

- Hot stars and mass loss phenomena, Supernovae (STScI, CT)
- Interacting Binaries (PD, RM)

- Cool Stars, Atmospheric Structure, Magnetic Activity (CT, TS)
- Stellar populations in Galaxies (NA)
- Cataclysmic Variables (NA, RM)

INSTITUTE OF ASTRONOMY Telescope and Payloads

The telescope is heritage of the

Spectrum-UV Project.
To be used by WSO/UV it was necessary to have optical modifications, mass reduction, cos reduction.

Fine Guidance

System (FGS)

•In the WSO/UV design, the FGS units are part of the focal plane instruments.

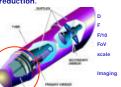
•The FGS are required to maintain during science observation a pointing error < 0.03 arcsec (1 σ) over a period of 24 hours on all

•To be able to support the tracking of objects moving up to 0.2 arcsec per second

s Requirements : Wavelength Range: 400nm .. 800nm (visible) Detector: 1024 x 1024 Pixel x16bit, CCD, pixel size

24um squared, overall active size 25mm x 25mm FOV: 55.2 arcsec square field extension

3 FGS arranged symmetrically around the optical axis with a distance of 20mm of each



1700 cm 30 arcmin (150 mm) 12.05 arcsec/mm

0.35 arcsec @ 633 nm 0.07 arcsec @ 122 nm

This is managed by

HIRDES: the High

of the German Orpheus

missions

Resolution Double Echelle Spectrograph is heritage

trance aperturecircular 80 im Illimator mirror toroidal, R1 = 1608 mm, R2 = 1593 mm circular 80 mm Echelle grating 40 grooves/mm, 66.9° blaze, 90 mm x 190 mm Cross dispersion prism 12° quartz, double pass, 100 mm x 110

n amera mirror spherical, R=1600 mm, 110 mm x 130 mm atector: 30 mm (echelle dispersion), 30 im resolution(pixe

Technical details of the VUV Echelle Spectrograph
VUVES – 102.8-172.6 nm
Intrance aperturecircular 80 in
ollimator mirror parabolic, R – 1600 mm, 6° off-axis, circularl

m :tor: 30 mm (echelle dispersion), 30 im resolution(pixel

mm
Detector: 80 mm (grating dispersion), 15 im resolution (pixelwidth)

Resolving power examples: R = 1000 (3 pixel criterion), 110 nm to 350 nm

WSO/UV Organizational status

The bus developed for Herschel/Planck has been selected by ESA as a working hypothesis for WSO/UV.

LAUNCHER

- Middle class launcher Soyuz-2, or Zenith2E with booster Fregat are capable to put into L2 point vicinity the S/C up to 3.6 ton
- -March launcher is under consideration

Possible Italian Contribution to **Phase A Study proposed to ASI**

The total membership of the NWWG's comprise 130 scientists from ESA member

states: 70 scientists in non-member states; and some 10 industries.

activities are coordinated by a WSO/UV Implementation Committee (WIC)

Non European Members: Russia (chair), Argentina, Cina, Israele

14 NWWG's representing scientists form 17 countries.

European Members: Francia, Germania, Italia, Olanda, Paesi Nordici (Danimarca, Finlandia, Lituania, Norvegia, Svezia), Spagna, Regno



Unito Others: ESA, UN









Detectors (Photon Counter Intensified Active Pixel Sensors PC-IAPS)

Catania (INAF), Milano (CNR), Laben (elettronica)

Fine Guidance System

Galileo Avionica, Dip. Astronomia di Firenze XUVLab, Laben

> Instruments Control & Data Processing Units (ICU/DPU)

> Scientific Objectives Definition

Researchers at several Institutions

- 1. Selection of filters for LIV and ontical cameras 2. Definition of strategies for pre/in flight calibration
- 3. Participation in the edition of the book "Science with WSO/UV" (ed. M. Barstow Leicester Univ., UK)

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