Decision document for the WSO/UV FCU
Adopted by the WSO Implementation Committee on Feb 21, 2006

Introduction
The WSO mission is devoted to get UV spectroscopy and imaging data. High spatial resolution and high sensitivity UV and optical imaging are a key objective of the project. Therefore, the WSO Implementation Committee planned to include a complement of UV and optical imaging detectors in the focal plane, to provide both serendipitous science during spectroscopic observations and planned studies of specific target areas.

Science drivers for the imaging instruments are:
  a) the auroras in solar system planets,
  b) the UV luminosity function of galaxies in clusters, groups, fields and void;
  c) a deep UV survey of the Virgo cluster;
  d) astrometry of galactic crowded fields – e.g. astrometry of old population stars in globular clusters.

The latter is a HST heritage project; it will provide data complementary to the GAIA ones.

Much of the available volume in the focal plane, immediately behind the primary mirror, is occupied by the HIRDES. This leaves only a very narrow space (about 10cm diameter cylinder) on the telescope axis that can be used for a direct on-axis imager, which samples the best diffraction limited resolution of the optical system.

Preliminary design studies of the imagers for WSO/UV have been conducted in Russia according to the WSO/UV Implementation Committee requirements. For estimates of size, mass, electrical properties etc, the design of the TAUVEX instrument (Israel) developed for Spectrum X-gamma, was considered as a prototype. Two main studies have been provided. The first one led to the “Conclusions and Action Items – WIC Meeting Moscow, 22/23 May 2002” document (Attachment 1), while the second one led to the “WSO/UV Implementation Committee Decision on Focal Plane Imaging Instruments” document (Attachment 2).

Decisions
- The UV and optical cameras should be all enclosed in one unit and allocated under the primary mirror on the top of the instrument compartment.
- The final design of the FCU has to be defined during the Phase A study under the Italian responsibility.
- The science specification for the FCU, summarized in Table 1, under which the Phase A study has to be conducted, are:
  - An optical camera (OC), to work at the best diffraction limited resolution with the largest FoV that is possible to accommodate (FoV to be defined during the Phase A study), intended to perform astrometry of crowded field
  - Two UV imagers: one F/50 camera with resolution of ~0.03 arcsec/pixel and ~1 arcmin FoV (LF), and one F/10 camera with ~0.15 arcsec/pixel resolution and ~5 arcmin FoV (SF). Each of these cameras is equipped with one or two filter wheels in order to accommodate passband filters according to the science case.
- The possibility to accommodate redundant UV and optical cameras in the FCU has to be evaluated during the Phase A study.
- The choice of detectors – MCP and/or CCD - will be a task of Phase A study.

<table>
<thead>
<tr>
<th>Camera</th>
<th>Range</th>
<th>Focal ratio</th>
<th>FOV arcmin</th>
<th>PSF sampling</th>
<th>Res. arcsec</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF</td>
<td>UV</td>
<td>F/10</td>
<td>6</td>
<td>0.15&quot;/pixel</td>
<td>0.3</td>
</tr>
<tr>
<td>LF</td>
<td>UV</td>
<td>F/10</td>
<td>1.2</td>
<td>0.03&quot;/pixel</td>
<td>0.1</td>
</tr>
<tr>
<td>OC</td>
<td>Visible</td>
<td>tbd</td>
<td>As large as possible</td>
<td>≤0.03&quot;/pixel</td>
<td>≤0.1</td>
</tr>
</tbody>
</table>
Attachments Index

1) Conclusions and Action Items – WIC Meeting Moscow, 22/23 May 2002, also available on http://wso.vilspa.esa.es/docs/WCC/MIN/Attachments/WIC-MIN-0005-1-0.PDF

2) WSO/UV Implementation Committee Decision on Focal Plane Imaging Instrument also available on http://wso.vilspa.esa.es/Conferences/Madrid_2003/decision_FP.PDF