Launch:
on Soyuz
from Kourou,
Late 2022

Mission Lifetime:
6+ years @ L2

Aperture:
1.2m

Near-Infrared Spectrometer and Photometer (NISP)

FOV:
0.78 x 0.73 deg
16 H2RGs
0.3” / pixel

Visual Imager (VIS)

FOV:
0.79 x 0.70 deg
36 4kx4k e2v CCDs
0.1” / pixel
<table>
<thead>
<tr>
<th>Proposed lifetime</th>
<th>2022 - 2032</th>
<th>2022 - 2028</th>
<th>2025 - 2031</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mirror size (m)</td>
<td>6.5 (effective diameter)</td>
<td>1.2</td>
<td>2.4</td>
</tr>
<tr>
<td>Survey size (sq deg)</td>
<td>20,000</td>
<td>15,000</td>
<td>2,227</td>
</tr>
<tr>
<td>Median z (WL)</td>
<td>0.9</td>
<td>0.9</td>
<td>1.2</td>
</tr>
<tr>
<td>Depth (AB mag)</td>
<td>~27.5</td>
<td>~24.5</td>
<td>~27</td>
</tr>
<tr>
<td>FoV (sq deg)</td>
<td>9.6</td>
<td>0.5 (Vis) 0.5 (NIR)</td>
<td>0.28</td>
</tr>
<tr>
<td>Filters</td>
<td>u-g-r-i-z-y</td>
<td>Y-J-H-Vis</td>
<td>Y-J-H-F184</td>
</tr>
<tr>
<td>Cosmological probes</td>
<td>WL, LSS, SN</td>
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<td>WL, LSS, SN</td>
</tr>
</tbody>
</table>
Euclid legacy science - some examples

Cool brown dwarfs - both in spectroscopy and imaging

Euclid NIR imaging: detection of giant branch stars out of 5 Mpc - streams, galaxy halos

2-3 orders of magnitude more strong galaxy lenses than before Euclid (1.5 SLACS/week)

Galaxy morphologies across the whole extragalactic sky (>10^3 x HST)

Rare objects galore - massive, passive galaxies with spectra to H~23, the brightest z>7 Ly-a emitters, ...

Euclid will find the sources to follow-up for years to come

<table>
<thead>
<tr>
<th>What</th>
<th>Euclid</th>
<th>Per deg^2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galaxies at 1&lt;z&lt;3 with good mass estimates and morph.</td>
<td>~2x10^8</td>
<td>~10^4</td>
</tr>
<tr>
<td>Massive galaxies (1&lt;z&lt;3) w/spectra</td>
<td>~few x 10^3</td>
<td>~0.2</td>
</tr>
<tr>
<td>Hα emitters/metal abundance at z~2-3</td>
<td>~4x10^7/10^5</td>
<td><del>10^9</del>10</td>
</tr>
<tr>
<td>Galaxies in massive clusters at z&gt;1</td>
<td>~2(2-4)x10^4</td>
<td>~40 (per cluster, HAB&lt;22.5)</td>
</tr>
<tr>
<td>Type 2 AGN (0.7&lt;z&lt;2)</td>
<td>~10^4</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Galaxy mergers</td>
<td>~10^5-few x 10^6</td>
<td>1-100</td>
</tr>
<tr>
<td>Strongly lensed galaxy-scale lenses</td>
<td>~200,000</td>
<td>1-10</td>
</tr>
<tr>
<td>z &gt; 7 Ly-a emitters</td>
<td>~few 10^3</td>
<td>&lt;&lt;1</td>
</tr>
<tr>
<td>Resolved stellar populations</td>
<td>~13? with Mabs &lt; -19</td>
<td>&lt;&lt;1</td>
</tr>
</tbody>
</table>
Remaining activities to launch & commissioning

Euclid Timeline

SPC (spacecraft) (ground segment/data processing)
ENSCI

• NASA has established the Euclid NASA Science Center at IPAC (ENSCI) in order to support US-based investigations using Euclid data.

• ENSCI primary tasks:
  • T1: US Community Support
  • T2: Detector Characterization Data Archive
  • T3: Contribute/Gain expertise in pipelines
    • Participation in NISP algorithm/software design and high level calibration tasks
    • Develop production software in our role as SDC-US-Dev
  • T4: Establish and operate SDC-US [production side]
    • data processing, storage, and access
    • Node in distributed processing system
  • T5: Work closely with SOC on Data Quick Look Analysis (DQLA)
    • Gain insight into operations, advocate for US community needs
  • T6: Mission Verification working group
    • Insight into the big picture of science mission design

• For more details, see http://euclid.caltech.edu
ENSCI and the US Community

• ENSCI work pre-launch will prepare us to support US community research
  • Presence at IPAC booth at AAS
  • Website and Helpdesk
  • User Panel (starting 1 year before launch)

• Science potential of archive is enormous
  • Imaging at 0.1-0.3” pixels, ~24mag Vis, Y, J, H over 15,000 deg$^2$
  • >2B galaxy photo-z; ~50M grism redshifts
  • ~1000 multiply-imaged QSO and ~300K strongly lensed galaxies

• Expect a flood of proposals after first public data release
  • Spitzer and WISE were each ~40% of ADAP in their first year
Euclid Structures- how to join

• Euclid Consortium (EC) >1500 members
  – About 100 from US
  – ~10 science working groups
  – Possible to join: compelling contribution to Euclid, support of science working group lead(s), sufficient funding to cover engagement

• Euclid Consortium Board (ECB), ~ 20 member governing body of EC appointed by
  – Jason.d.rhodes@jpl.nasa.gov is US rep

• ESA Euclid Science Team (EST), 13 member ESA body that ‘safeguards’ science requirements, ensures mission success, defines additional surveys
  – Jason.d.rhodes@jpl.nasa.gov is US rep

• Thoughts, ideas, questions, please contact Jason