



# Status Report on the Alignment Efforts @ DESY

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## DESY Today and Tomorrow: Strategy 2030

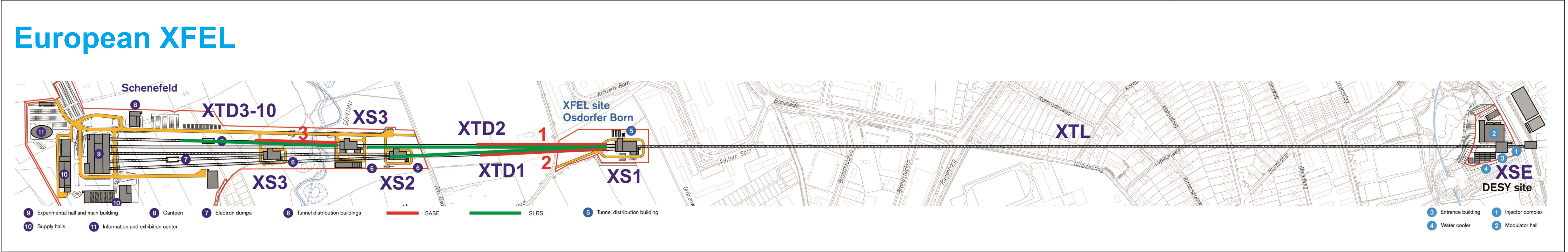



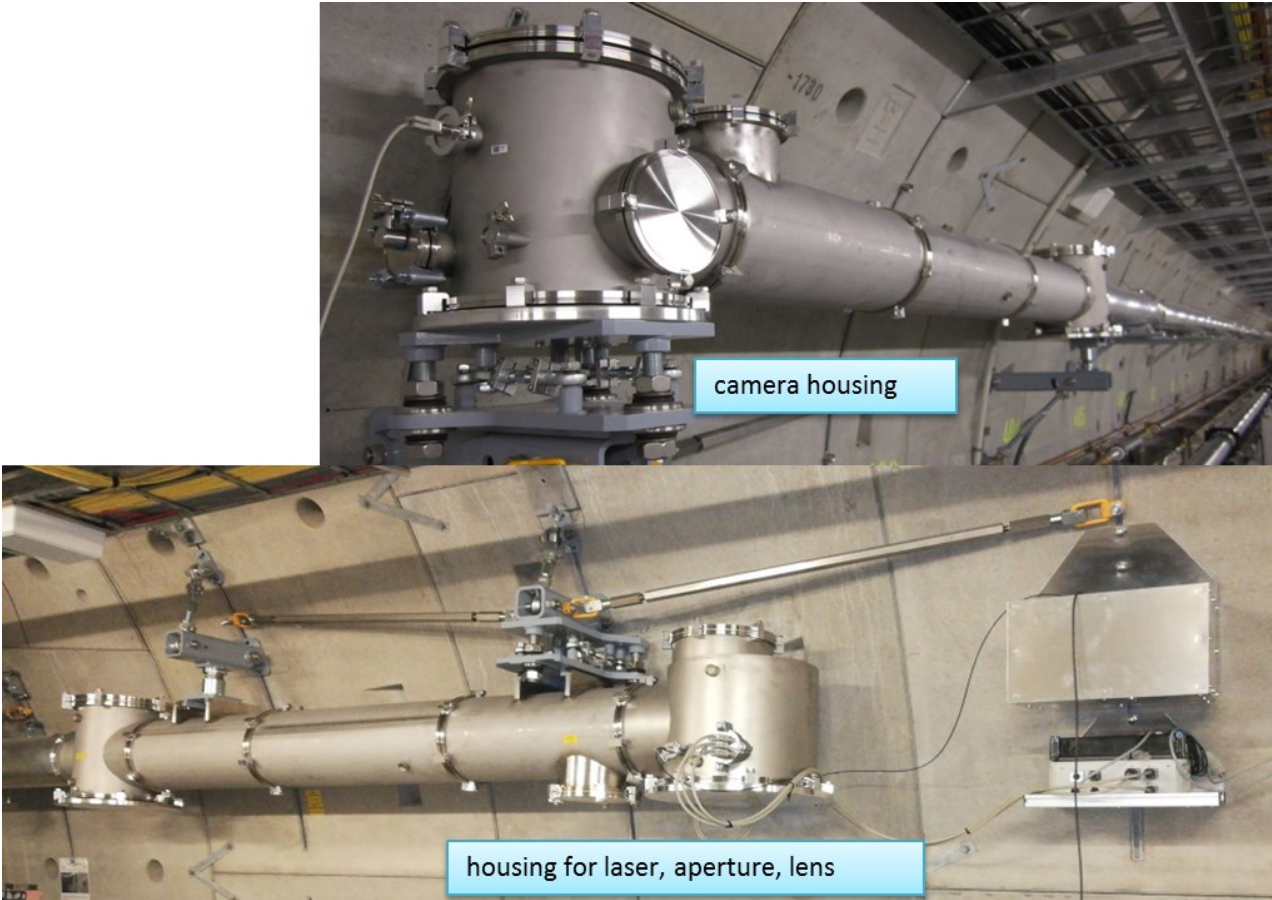
### Strategy 2030: Planning for the Future

The light blue colours indicate buildings planned for the DESY Site in **Strategy 2030**. Most significant are the subterranean hall in the southwest of PETRA and the region at the old horse racing course. Many new science centers are to be added to the campus, all benefitting from the infrastructure. They include research areas in data and computing (CDCS), biological chemistry, pathogenic organism, nanotechnology and also, simply, water(CWS).



<h3>PETRA III</h3>  <p>Here you can see aiming points around a critical joint in PETRA III</p> <p>To achieve the accuracy required for PETRA IV, it is important to monitor and correlate the movements of the buildings of the accelerator complex.</p> <p>For this purpose it is necessary to monitor 5 essential areas around PETRA III.</p> <p>At the beginning of this year we started regular monitoring of these buildings with our photogrammetry equipment V-Stars N from Geodetic Systems. These measurements will be repeated every 2 months. First results show movements between 1.5 and 4.5 mm mostly in the longitudinal direction.</p>	<h3>FLASH I + II</h3>  <p>A View into FLASH I</p> <p>A refurbishment of the accelerator section included the replacement of 2 accelerating modules and 2 bunch compressors. One of the modules will be a modified type. This one needs the most advance, because of the complex structure inside.</p>	<h3>REGAE, SINBAD etc.</h3>  <p><b>Relativistic Electron Gun for Atomic Exploration (REGAE)</b> is a small 10 meter long electron accelerator which works like a transmission electron microscope to directly observe the most venerable concepts in chemistry and biology.</p>  <p><b>Short Innovative Bunches and Accelerators at DESY (SINBAD)</b> is located in the building of the old DORIS ring (1974 – 2012) and contain different new types of accelerators like ARES and LUX.</p> <p>There arise several new at different locations on the DESY campus.</p>	<h3>ALPS</h3>  <p>Transfer measurement of one dipole with a Leica AT960</p> <p>The <b>Any Light Particle Search (ALPS)</b> is a "Light-shining-through-a-wall" experiment for the search for photon oscillations into weakly interacting sub-eV particles.</p> <p>ALPS will be located in the HERA experimental hall North.</p> <p>For this purpose come 20 old superconducting dipoles into operation, which were produced for the disused accelerator HERA (1992 – 2007). The experiment makes it necessary to straighten the beam pipes inside the dipoles. We are monitoring this process with a self centering moveable target, which we pull through the pipe.</p>
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<h3>Status</h3>  <p>On the occasion of the opening ( 01 September 2017) the Elbe Philharmonic Hall sends a laser-beam greeting to the X-ray laser XFEL.</p>	<p>The largest X-ray laser in the world generated its first laser light on 12 May 2017. This was a great success for everyone involved, including the alignment group.</p> <p><b>Current Status:</b></p> <p>XTD1 - 5, 9 and 10 with the <b>two SASE areas 1 and 3</b> are in operation.</p> <p>XTD6 and the <b>SASE area 2</b> is following soon.</p> <p>On September 5<sup>th</sup> the first users experiments were started successfully.</p>	<h3>SLRS</h3>  <p><b>The Straight Line Reference Surveyor (SLRS) is installed and working in all 3 XFEL SASE areas.</b></p> <ul style="list-style-type: none"><li>The SLRS (Straight Line Reference Surveyor) is a refraction free alignment system</li><li>It uses a collimated laser beam within an ISO200 vacuum tube</li><li>Spheres (or disks) put into the beam along the measuring section originate a poisson spot behind the centre of the sphere which can be viewed with a ccd camera at the end of section</li><li>The centre of the target and the centre of its poisson spot in the image generate a straight line</li><li>SLRS is used like a ruler put into the seemingly bent (by refraction) tunnel network</li><li>The SLRS provides correction parameters (dx, dz) for the geodetic network</li><li>Calibrated transfer pieces are used to connect the SLRS measurements with the tunnel network</li></ul>
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