WEPPP010

The MID Instrument at the European XFEL: Upgrades (MDS_2, MPC-2) and Experimental Setups

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Abstract / Introduction

This poster provides insight on some examples of Upgrades currently under development at Eu.XFEL MID Instrument, e.g.:

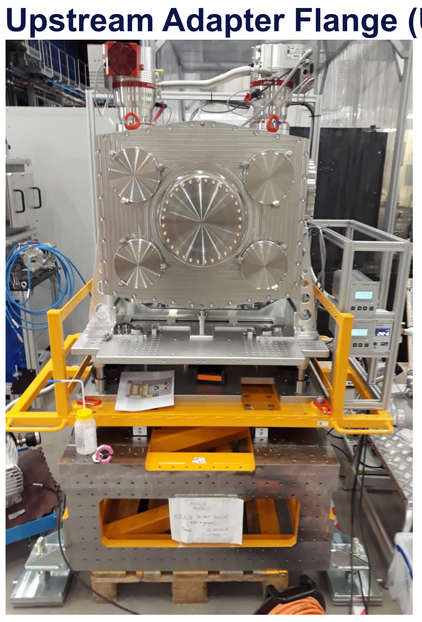
*- The **Multi-environmental multi-Detector Setup**:* **MDS_2** *– design, simulation, implementation:*
Support Structure Girder (SSG) + airpads, Upstream Adapter Flange (UAF), Port Aligners (PA), Movable Chamber (MC), Beam Stop (BS), Zero Length Adapter (ZLA), DN250 Tube Assembly (TA-DN250), DN250 Pipe Support Assembly (PS-DN250), DN100 Tube Assembly (TA-DN100), DN100 Pipe Support Assembly (PS-DN100), Manipulator

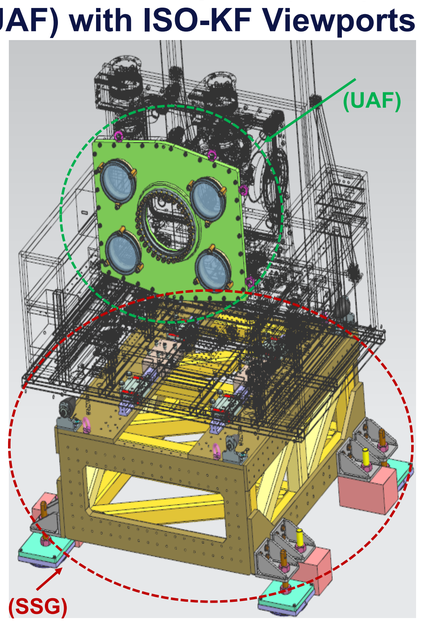
*- The Mid **MULTI PURPOSE CHAMBER v.2**:* **MPC-2** *– status of the current MPC evolution: Exterior and Interior - concept design, scenarios, simulations:*
MPC-2 Chamber UPGRADE SUCCESSOR (MPC-LUSu), MPC-2 UPGRADE SEGMENTED (MPC-LUSe)
MPC-2 Interior UPGRADE (MPC-IU), Diam-Detector-SETUP Assembly, INTERFEROMETER, Local Optics (LO) LO_Y-Motion-Upgrade

*- Examples of some relevant **Experimental Setups** designed and implemented in the direction of simultaneous multi-detector usage at MID Instrument*

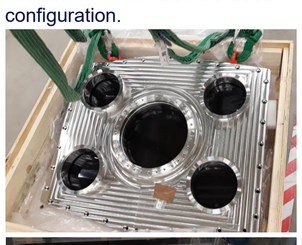
The Multi-environmental multi-Detector Setup (MDS_2) *

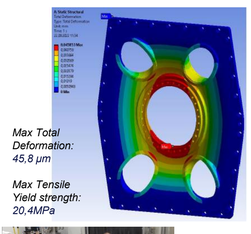
MDS_2 Support Structure Girder with Airpads (SSG), Upstream Adapter Flange (UAF) with ISO-KF Viewports

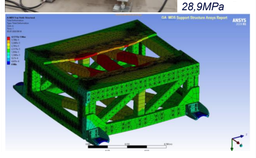




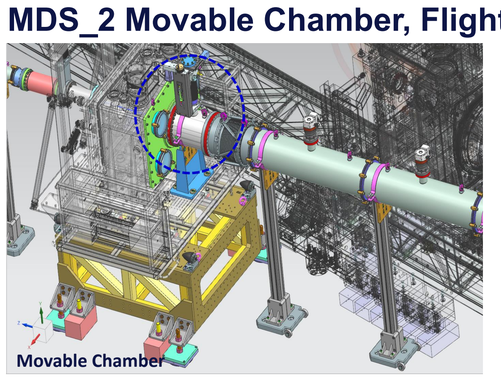
The **Multi-environmental multi-Detector Setup** (**MDS_2**) is a set of Setups designed to integrate in the MID Instrument an additional detector chamber (the Multi Detector Stage, MDS) to be used in parallel with the AGIPD detector, allowing simultaneous coverage of the wide- (WAXS) and small-angle X-ray scattering (SAXS) regions by use of several area detectors. It can also be used in Large Field-of-View (LFOV) configuration.

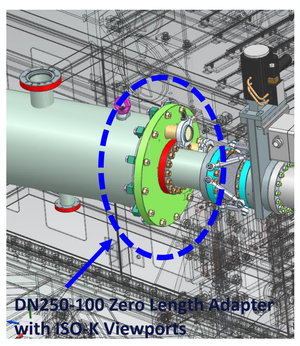




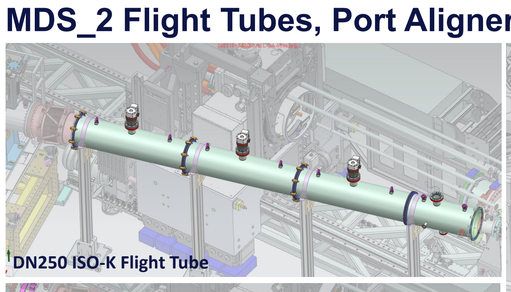


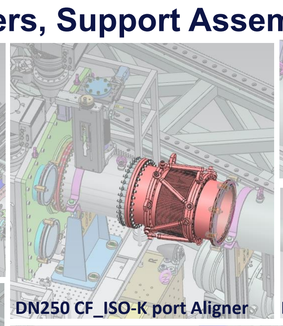
MDS_2 Movable Chamber, Flight Tubes, Zero Length Adapter

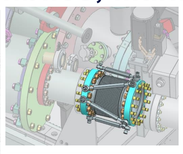


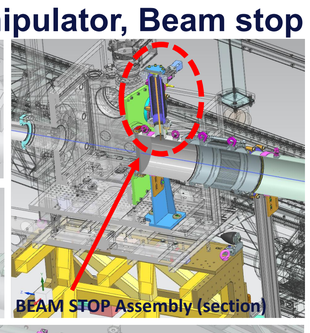


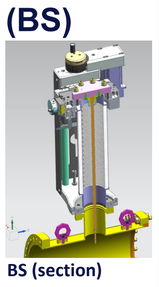
MDS_2 Flight Tubes, Port Aligners, Support Assemblies, Manipulator, Beam stop (BS)

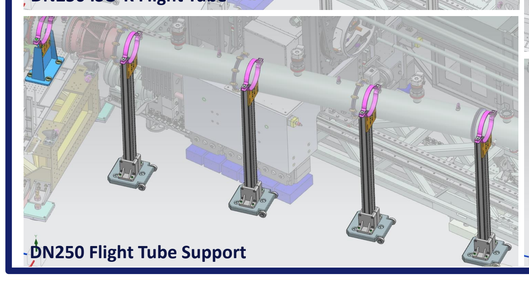


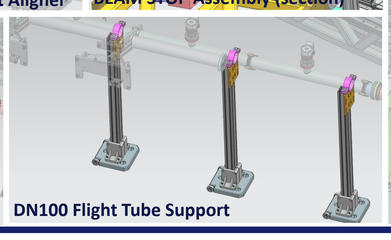


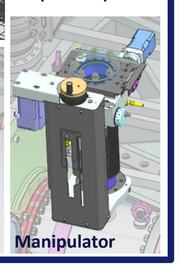






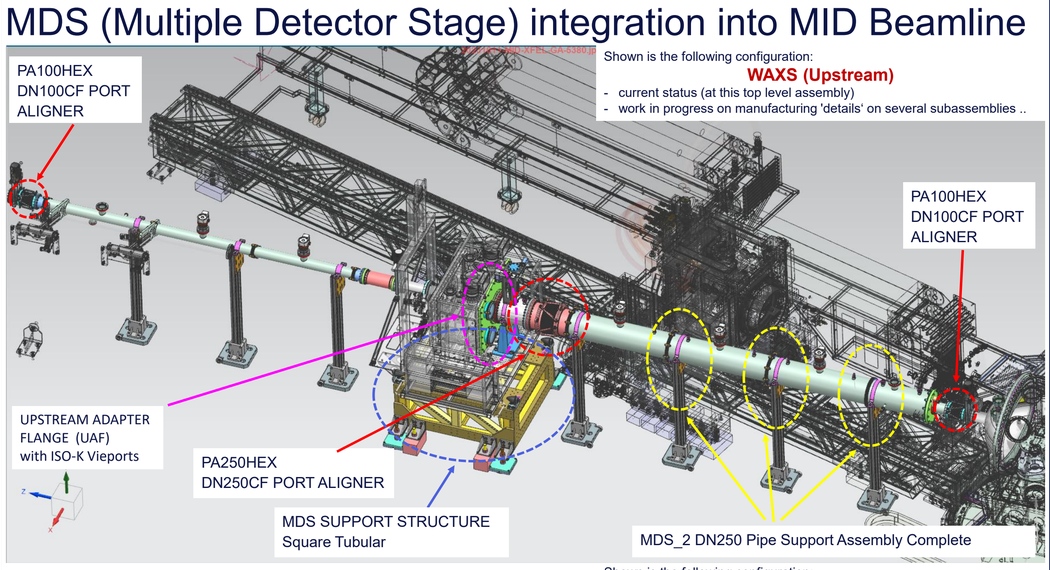




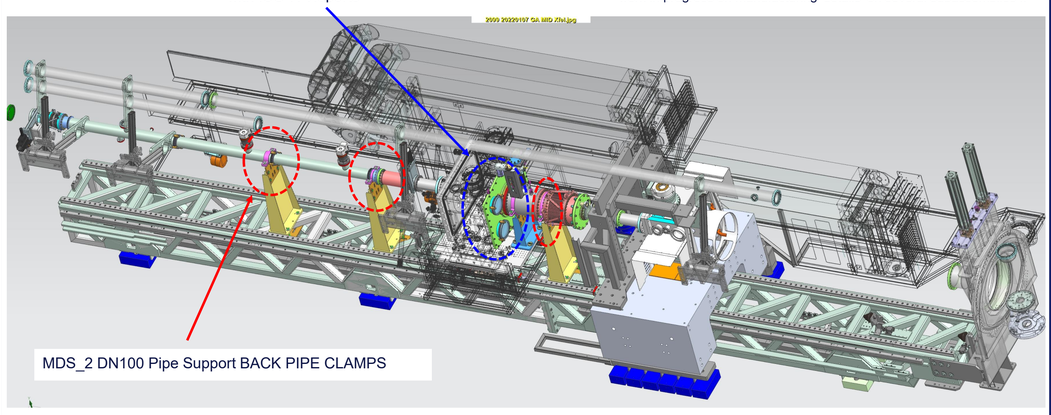


MDS_2 ENVIRONMENT: (See also the poster: **WEPPP012**)

MDS (Multiple Detector Stage) integration into MID Beamline

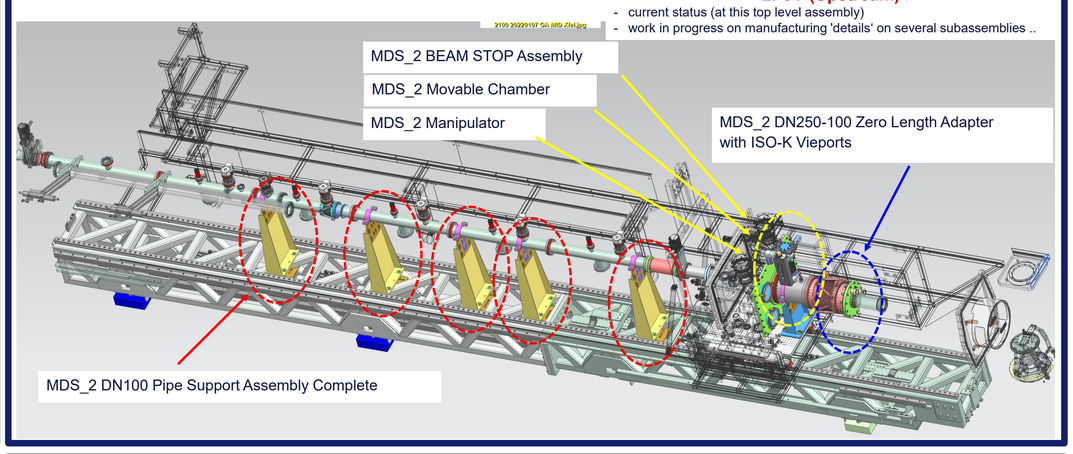


Shown is the following configuration:
WAXS (Upstream)
- current status (at this top level assembly)
- work in progress on manufacturing 'details' on several subassemblies ..



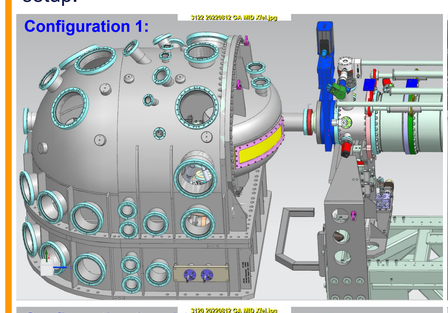
Shown is the following configuration:
SAXS (Upstream)
- current status (at this top level assembly)
- work in progress on manufacturing 'details' on several subassemblies ..

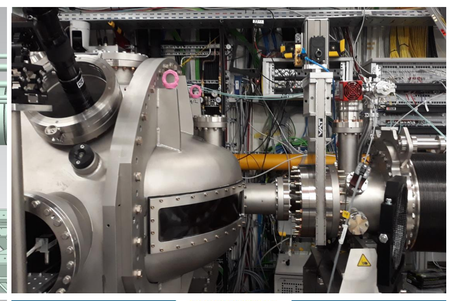
Shown is the following configuration:
LFoV (Upstream)
- current status (at this top level assembly)
- work in progress on manufacturing 'details' on several subassemblies ..

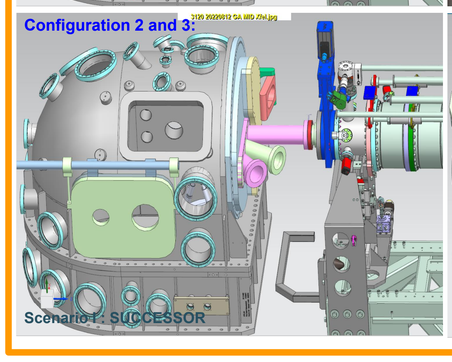


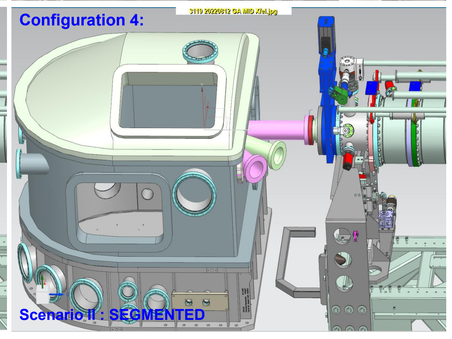
MID Multi-purpose Chamber-2 *(Scenarios in progress)*

The MPC-2 represents another Upgrade of MID Beamline XSIS currently in progress. It is concepted as the evolution of the currently existing multi-purpose chamber (MPC), intensively and successfully used during last 5 years of experiments at European XFEL facility. It aims to comply with several new scientific requests originated from many different experiments and it is intended to further expand MID Instrument capabilities in the future. These experiences have generated ideas for improvements of the MPC to facilitate an efficient experimental setup.

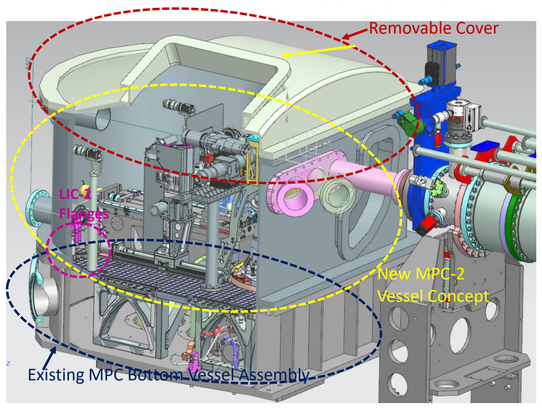




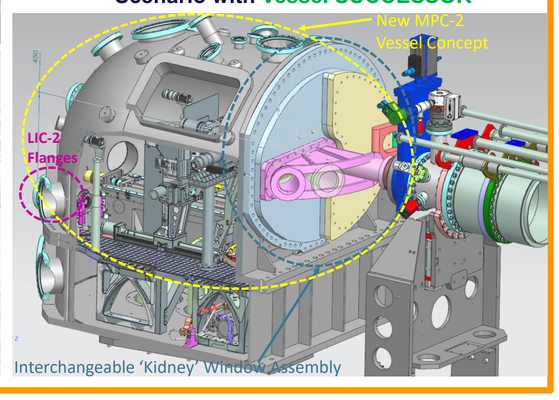




Scenario with Vessel SEGMENTED

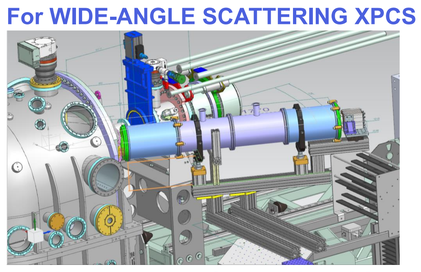


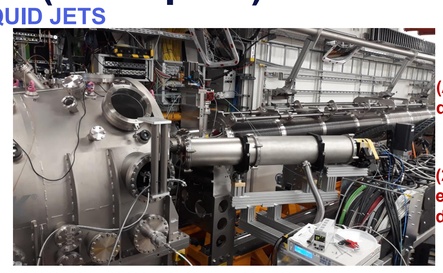
Scenario with Vessel SUCCESSOR



EXPERIMENTAL SETUPS (examples)

For WIDE-ANGLE SCATTERING XPCS ON LIQUID JETS

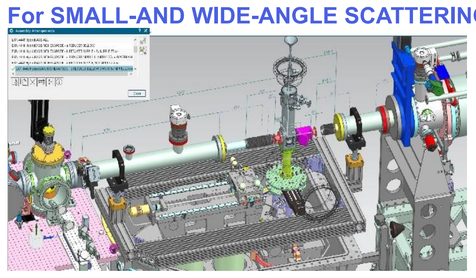




(AGIPD detector)

(2x or 4x ePIX detectors)

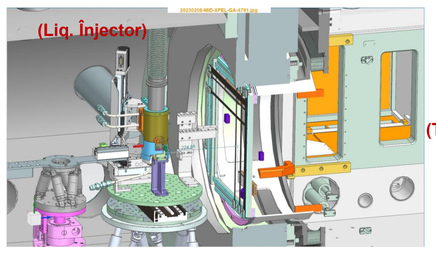
For SMALL-AND WIDE-ANGLE SCATTERING XPCS ON SOLID SAMPLES



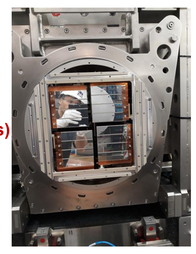
(AGIPD detector)

(Jungfrau detector)

For LARGE FIELD-OF-VIEW SCATTERING FROM SAMPLES IN LIQUID JETS



(Ta Masks)



(LFoV configuration)

ENLIGHTENING SCIENCE

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* See also: G. Ansaldi MEDSI 2018 Poster Nr. WEPH43 (Soleil, Paris) "MID at the European X-Ray Free-Electron Laser"

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