



KAMIOKA GRAVITATIONAL WAVE TELESCOPE

JGW- T1301588-v1

KAGRA

27 March 2013

Construction of Type-B seismic attenuation chain and Mirror assembly tooling

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Introduction

The KAGRA Type B seismic attenuation and mirror suspensions are assembled and mounted with custom design tooling, which were designed, built, cleaned and shipped to Japan by Galli e Morelli. The production is described here

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This is an internal working note of the

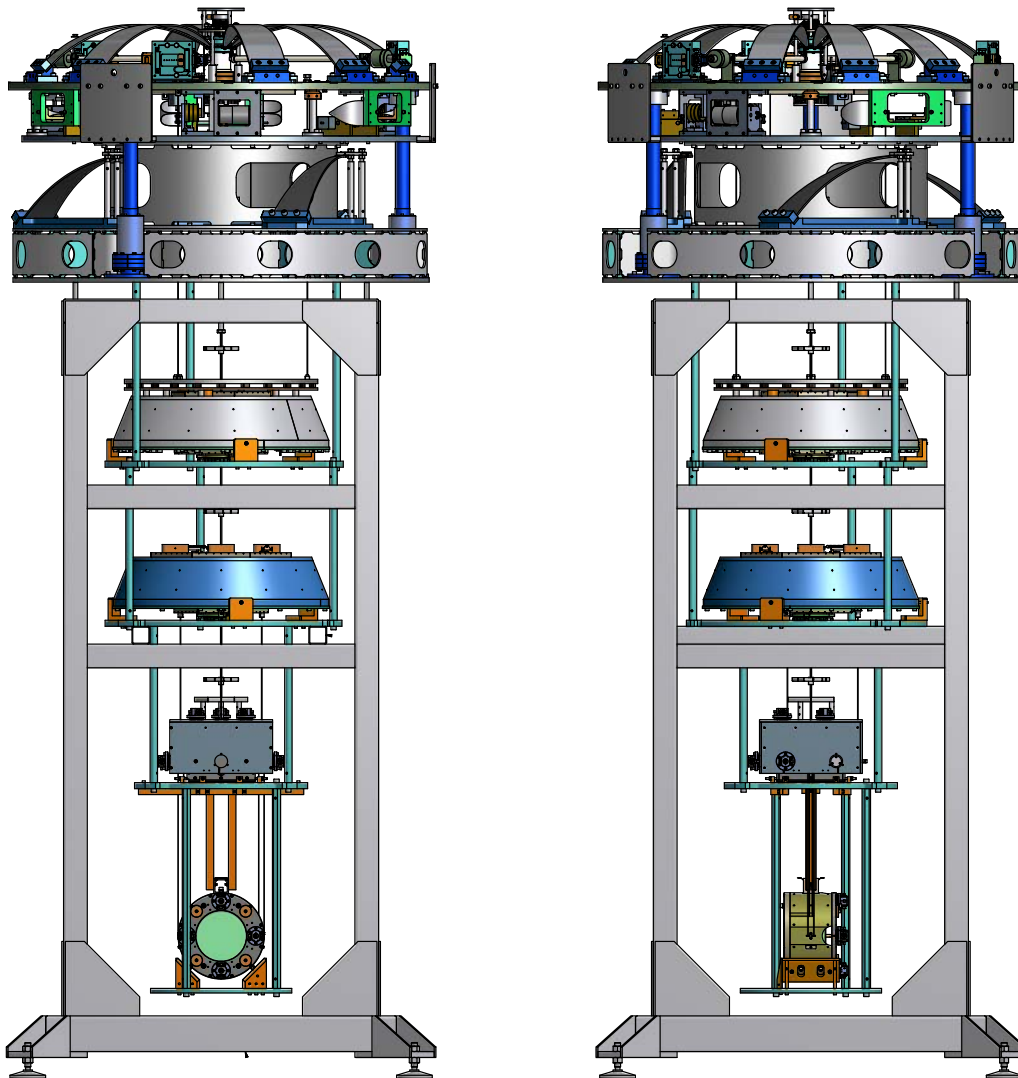
***KAGRA* Large-scale Cryogenic Graviational Wave Telescope Project.**

<http://gwcenter.icrr.u-tokyo.ac.jp/en//>

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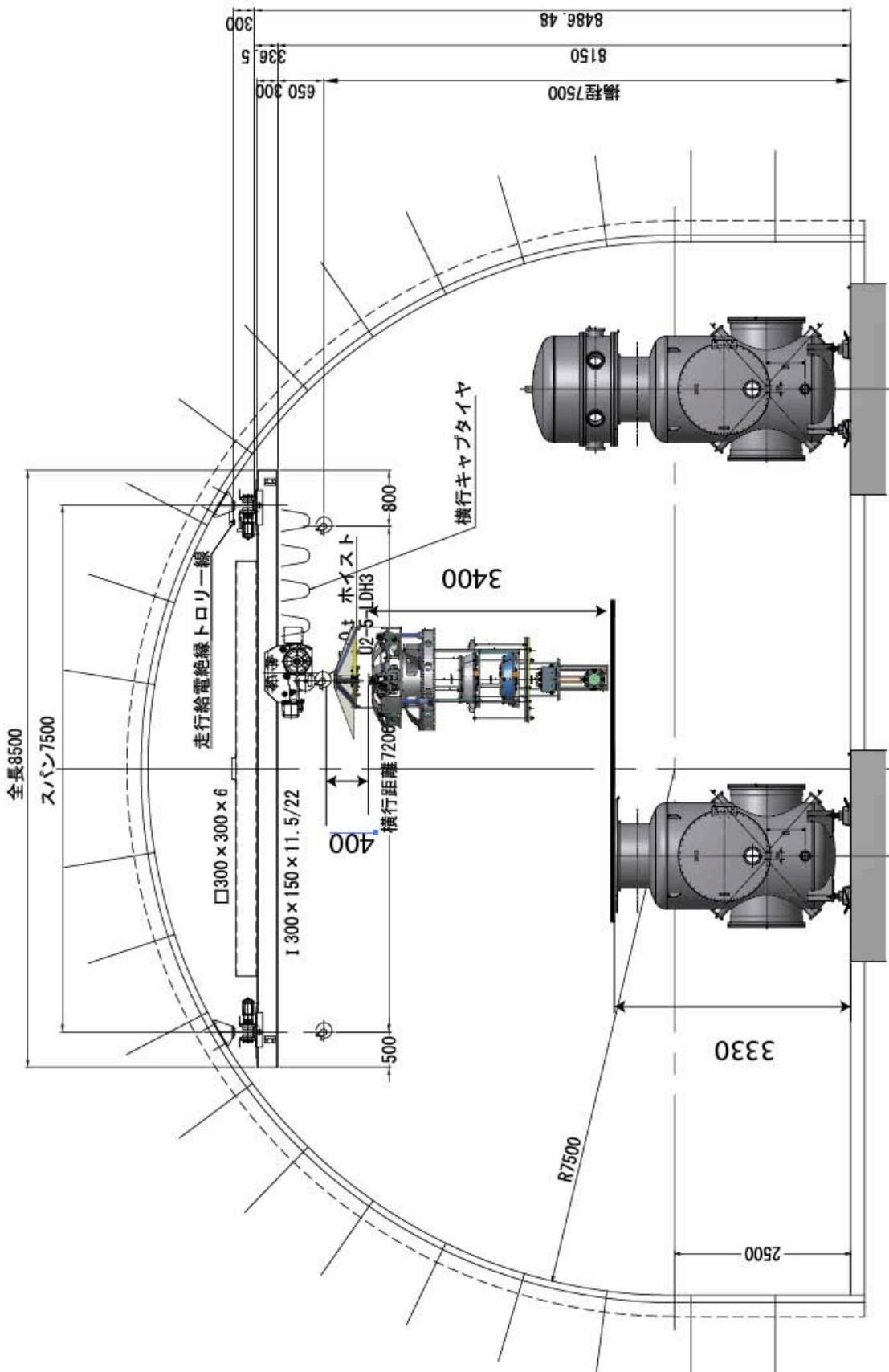
Type-B chain assembly tooling

KAGRA's type-B seismic attenuation and suspensions are designed to be assembled in a clean room in the experimental hall, and then installed into their vacuum chamber as a single unit, with the chain immobilized by and with respect to its safety structure, see also <http://gwdoc.icrr.u-tokyo.ac.jp/cgi-bin/DocDB/ShowDocument?docid=931> .
<http://gwdoc.icrr.u-tokyo.ac.jp/cgi-bin/DocDB/ShowDocument?docid=818>
 The chain assembly tools allowing this operation is shown here:



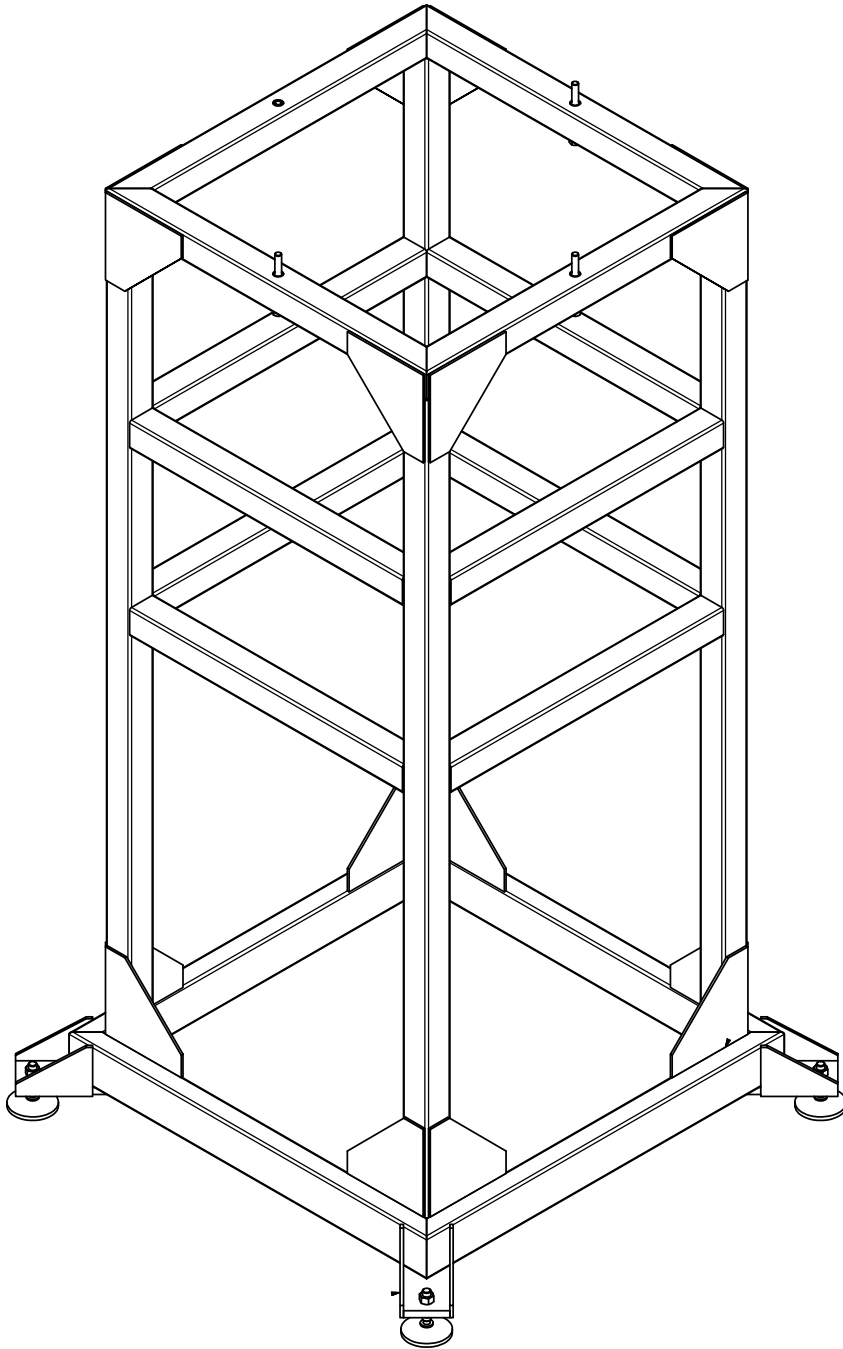
The installation operation is illustrated in the next page, and in report xxxx; it requires the full crane height and the complete removal of the vacuum chamber cap above the base-plate level.

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The clean room structure allowing the chain assembly is shown in this figure.



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The structure was built, cleaned and packed for shipment. Because this structure does not go into UHV, it was not necessary to bake it.



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The structure was secured inside the crate by means of wood blocks shown below, that need to be removed before extraction.



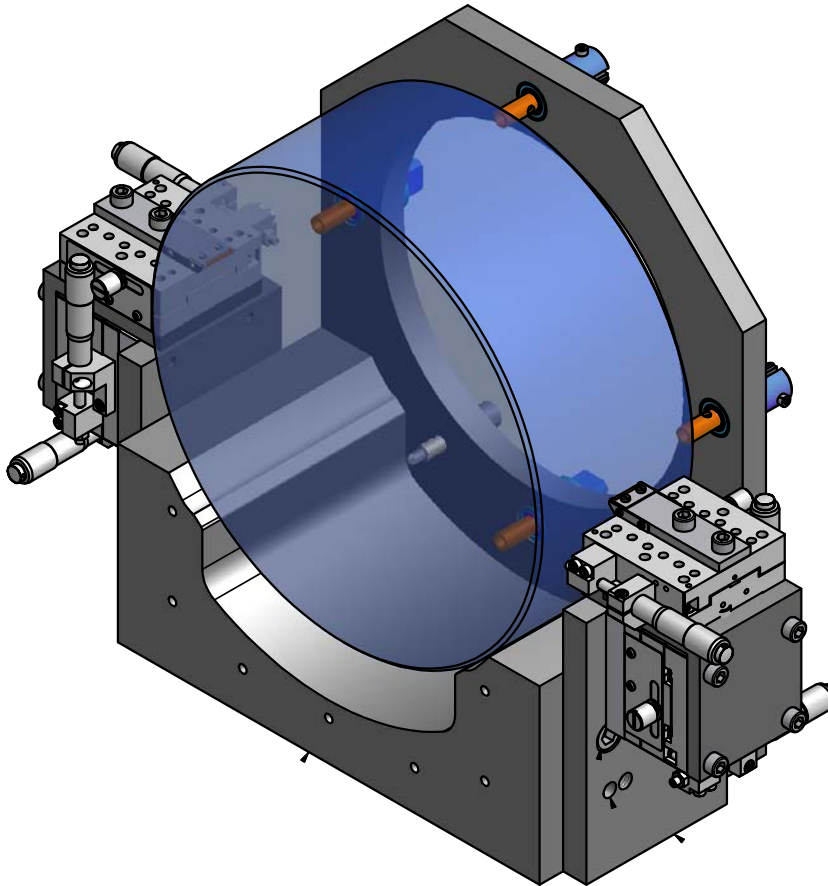
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The mirror assembly procedure is described in:

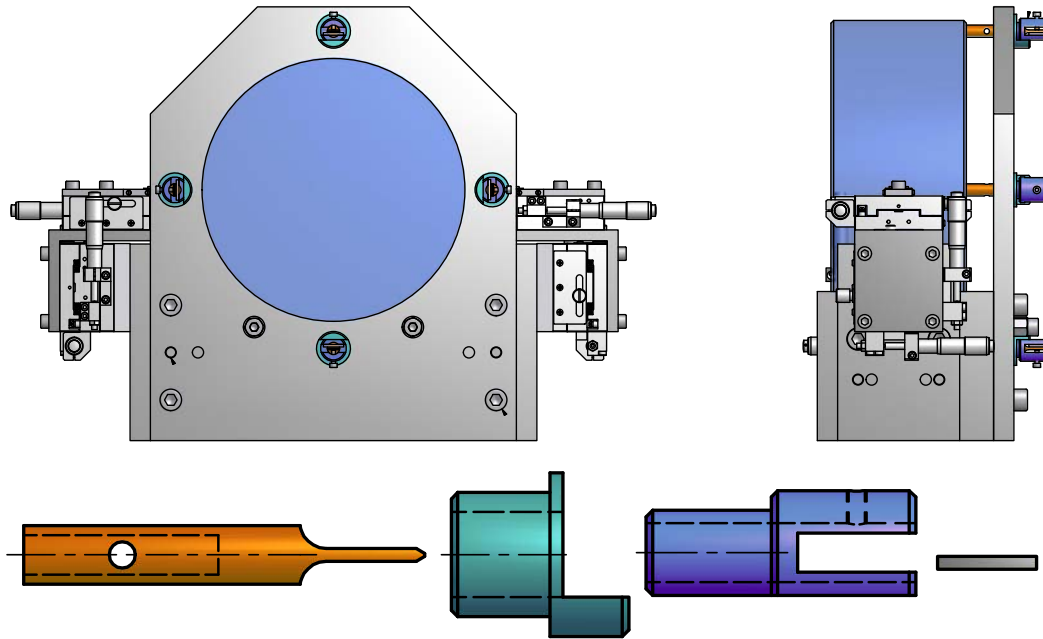
<http://gwdoc.icrr.u-tokyo.ac.jp/cgi-bin/DocDB/ShowDocument?docid=637>

Mirror wire standoff and control magnet gluing jig

The tooling necessary to position and glue wire standoff and control magnets is shown below.



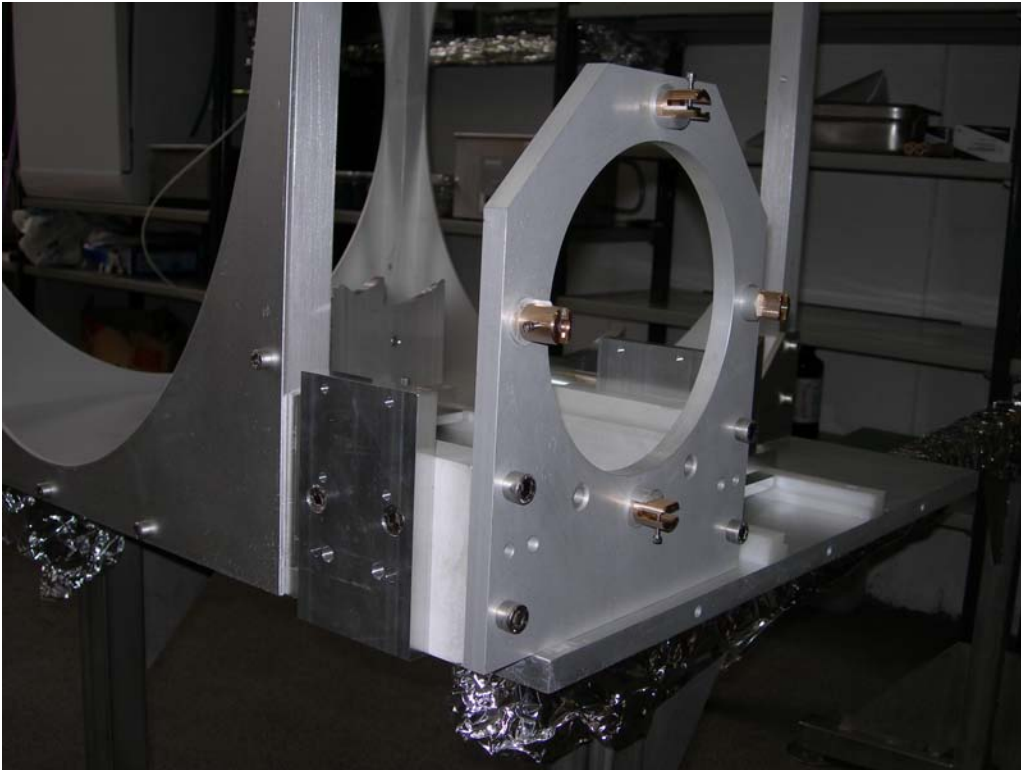
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The components (except for the commercially available micropositioners) have been built, test assembled, then cleaned and assembled



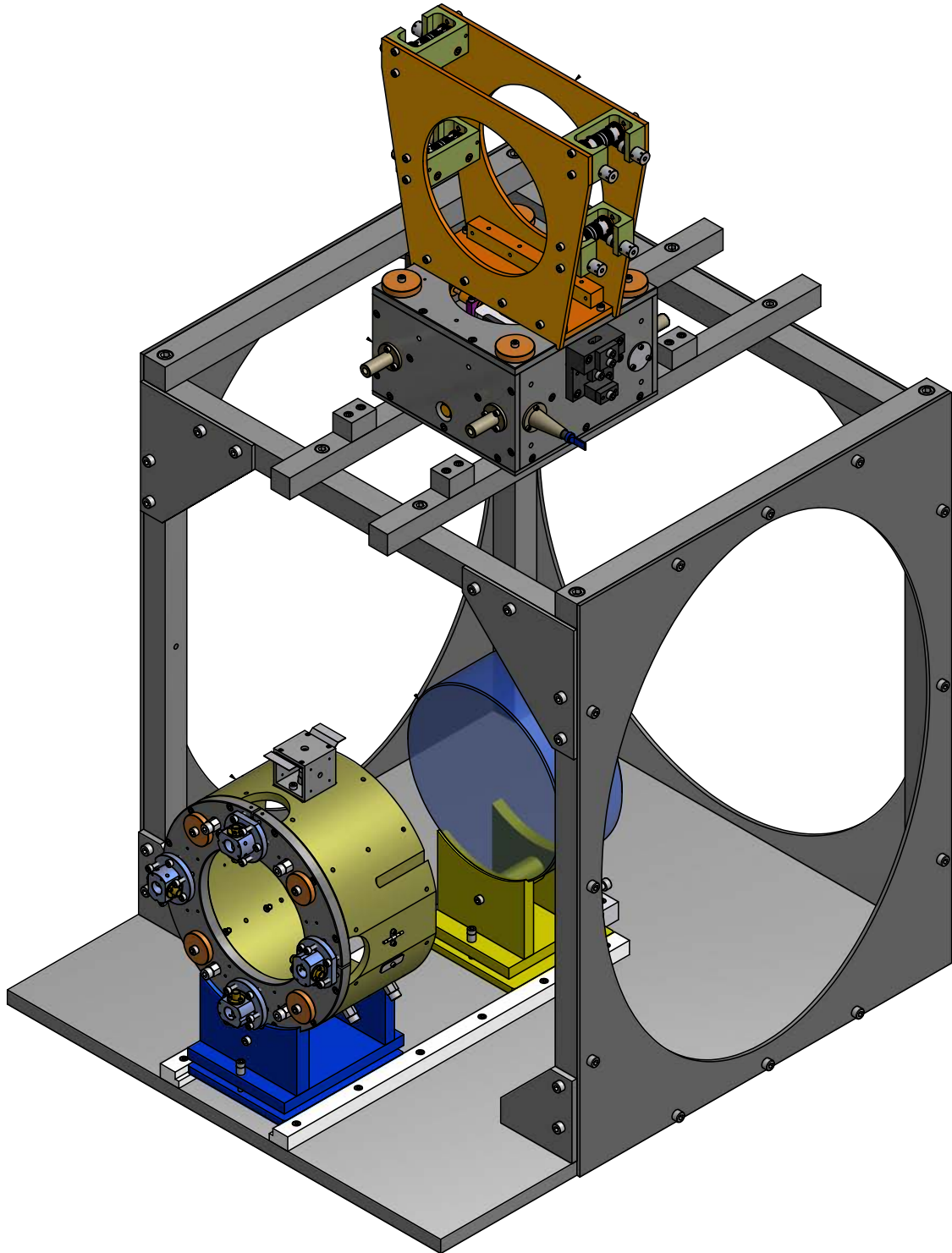
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Mirror and intermediate mass suspension tooling

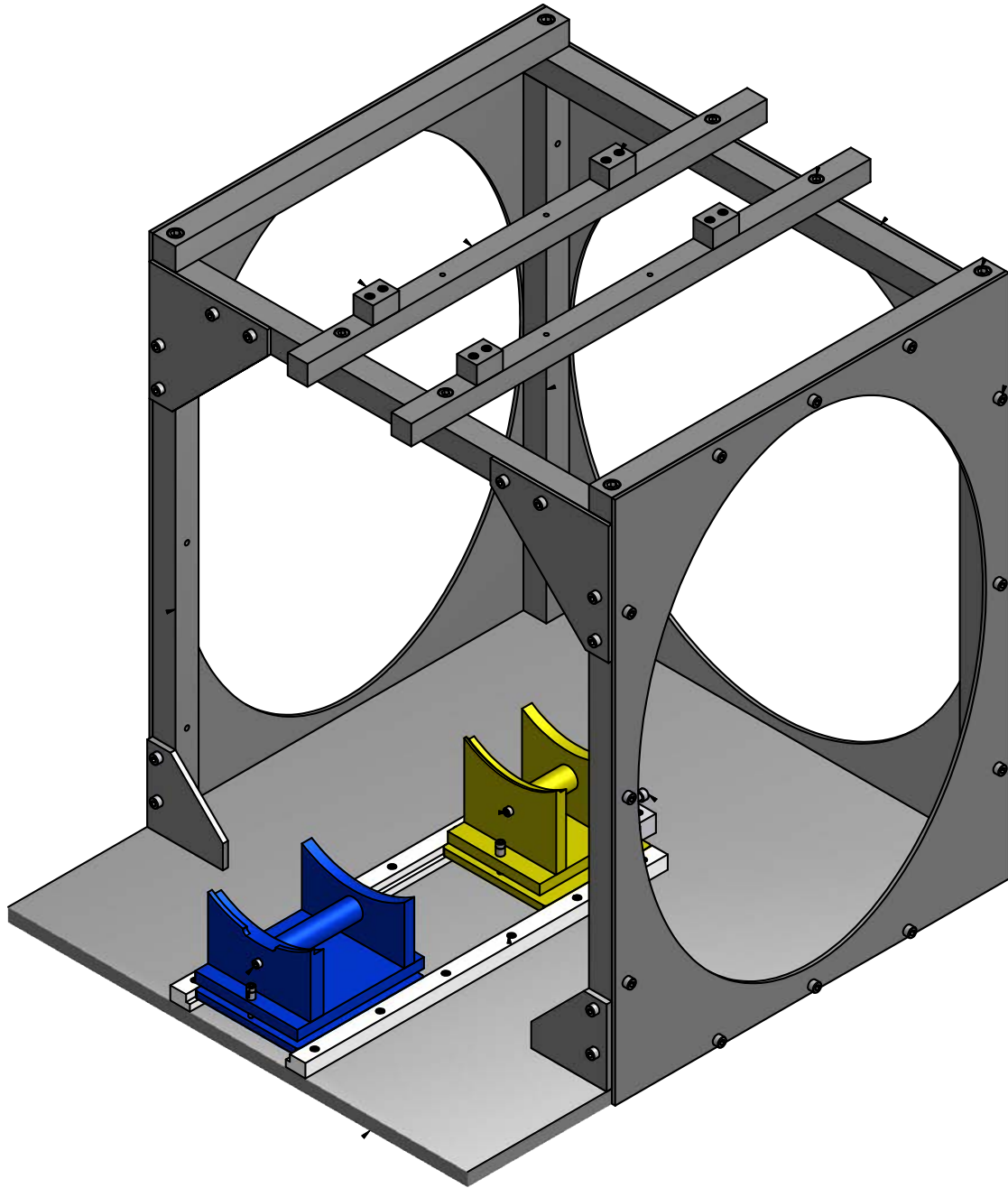
The general view of the suspension tooling are shown below, it is composed by a main frame with sliders to position mirror and its recoil mass, with respect to the intermediate mass and its recoil mass, and by a winch frame containing eight winches to lift the wires and precisely suspend the mirror and its recoil mass during assembly.

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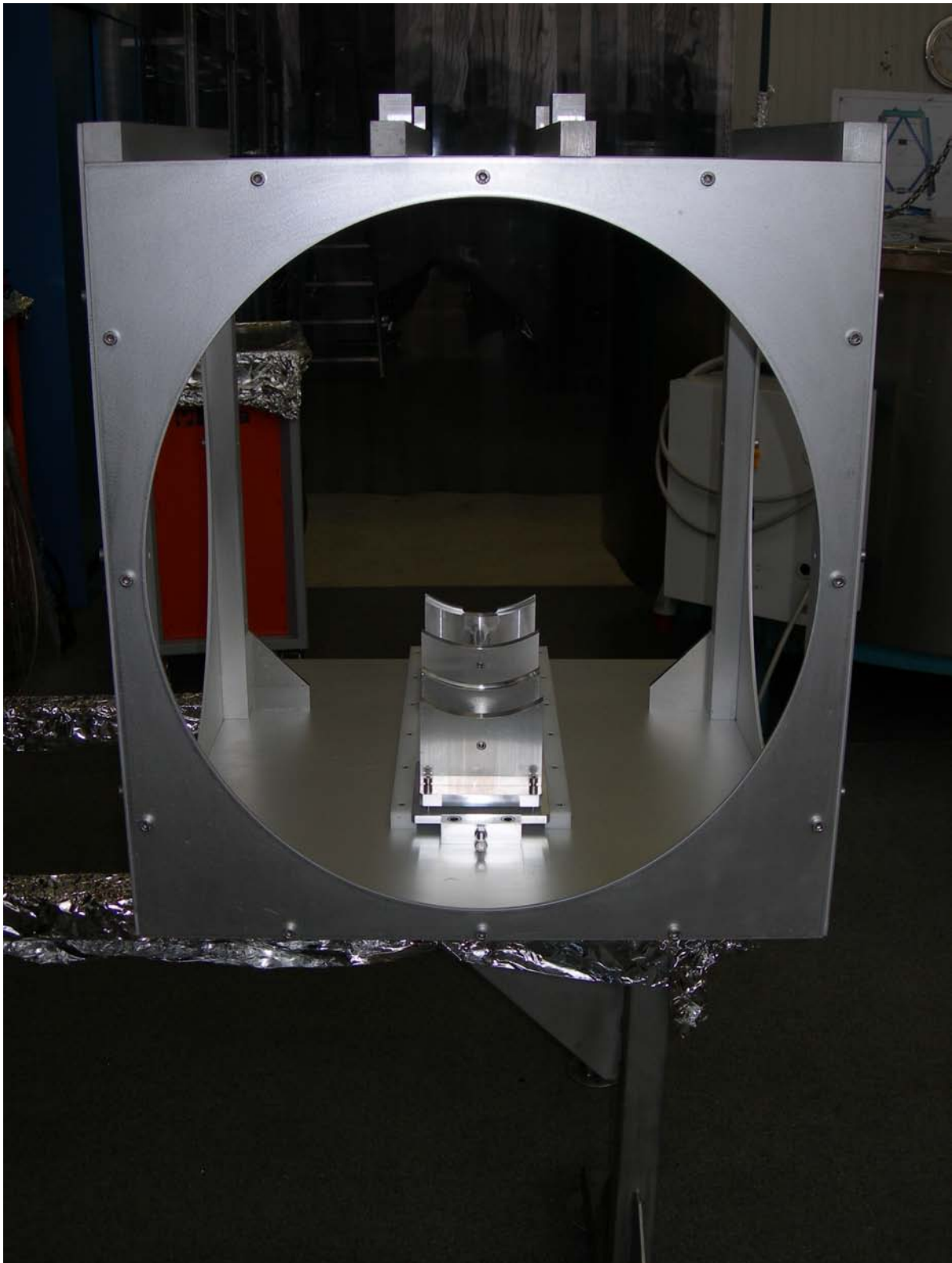
Main Frame and sliders:



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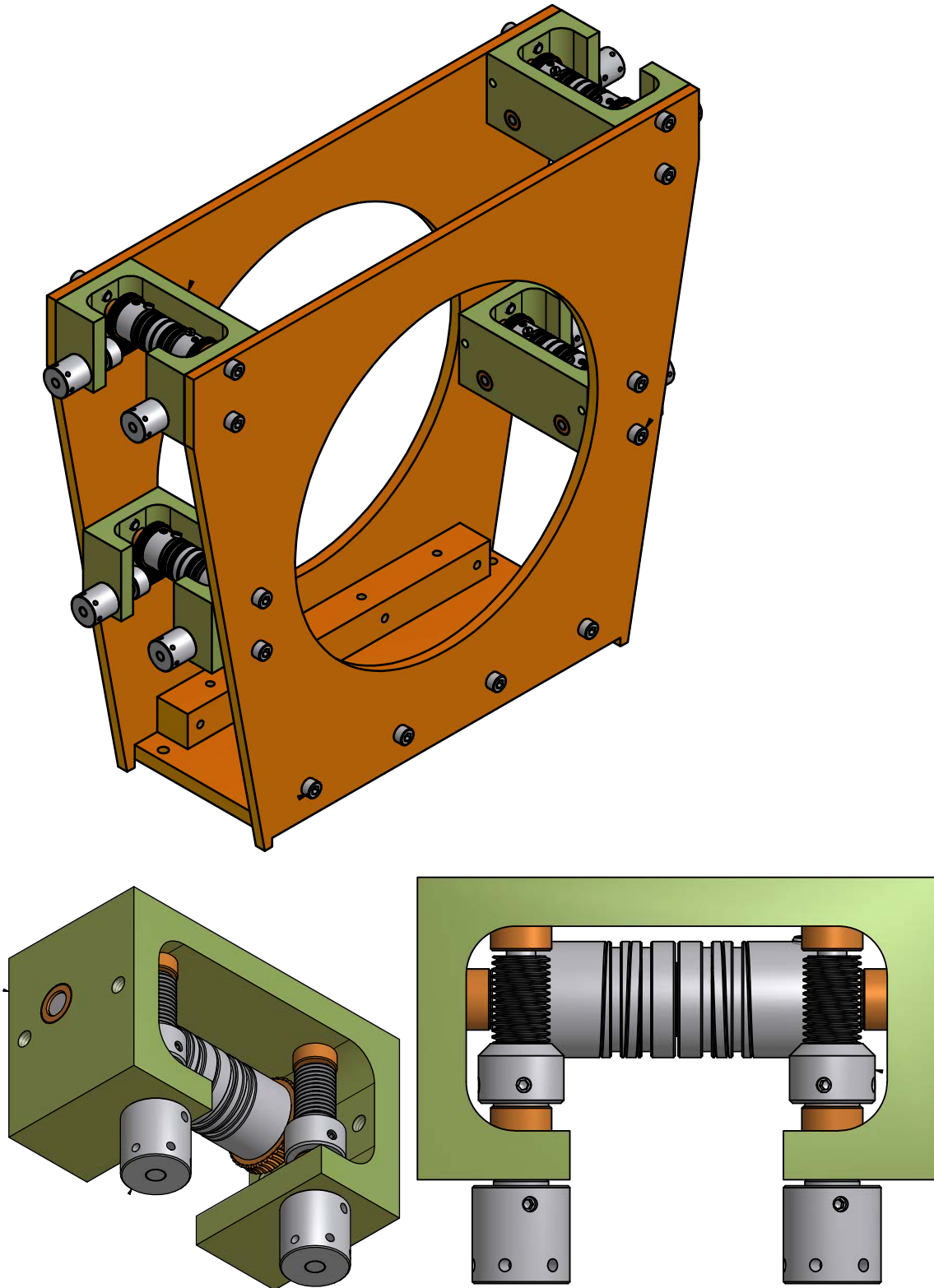


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Winch frame and winches:



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