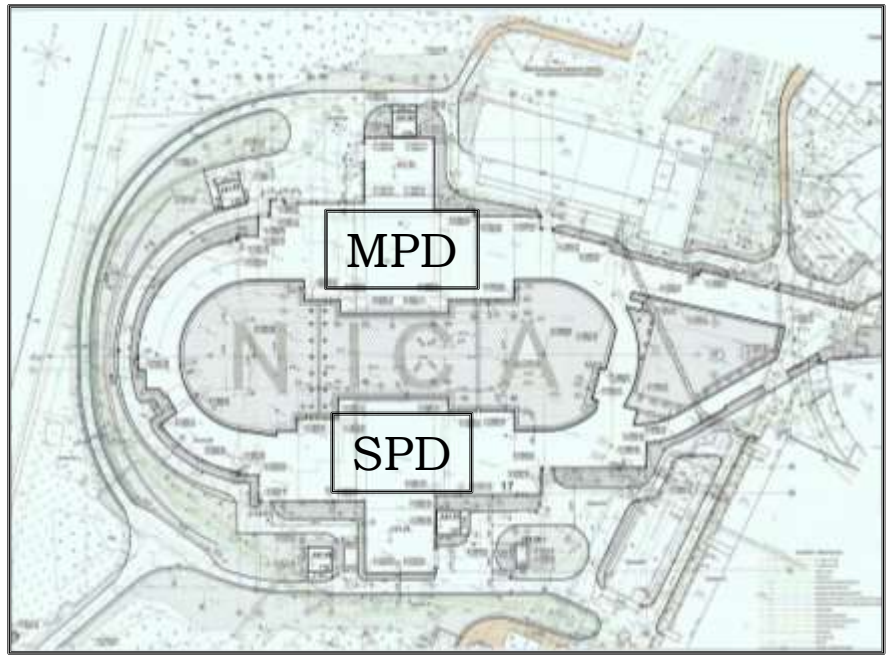
DRAFT

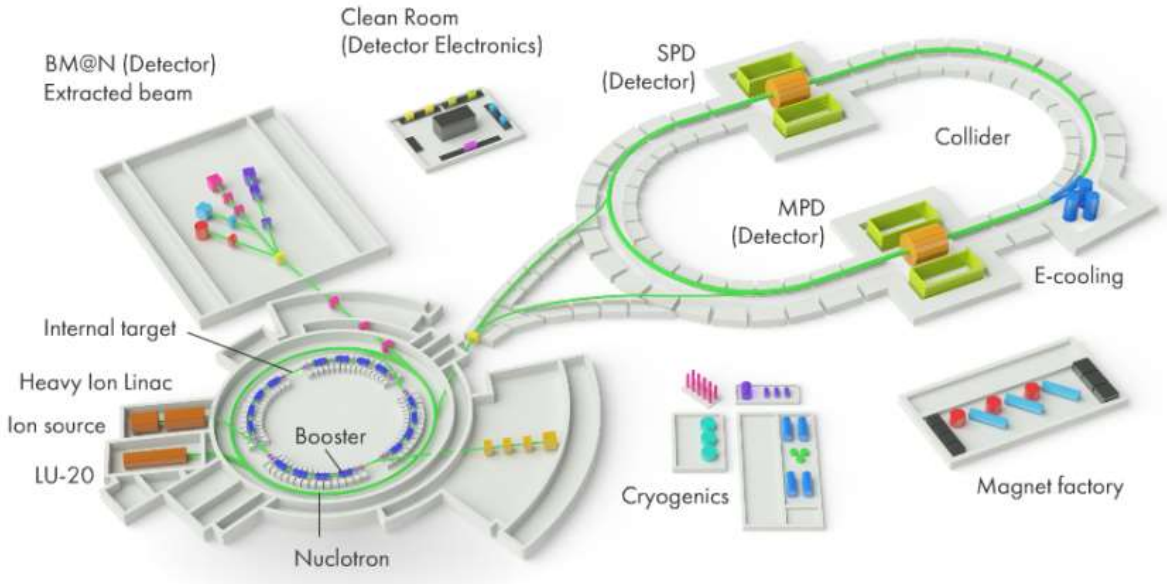
Status of development of magnet yoke

N. Topilin

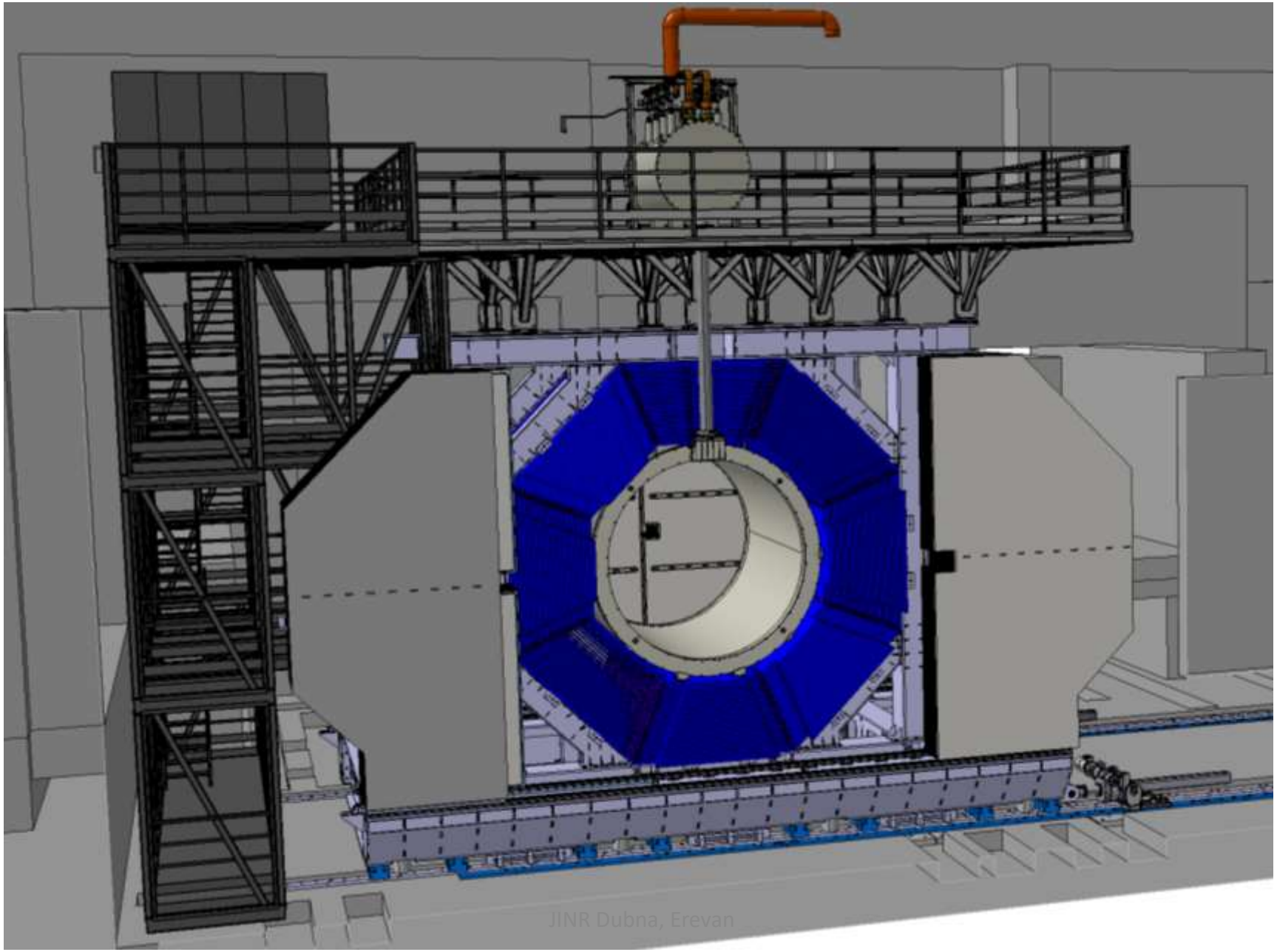
on behalf of VBLHEP design bureau №2

General plan of NICA area at VBLHEP



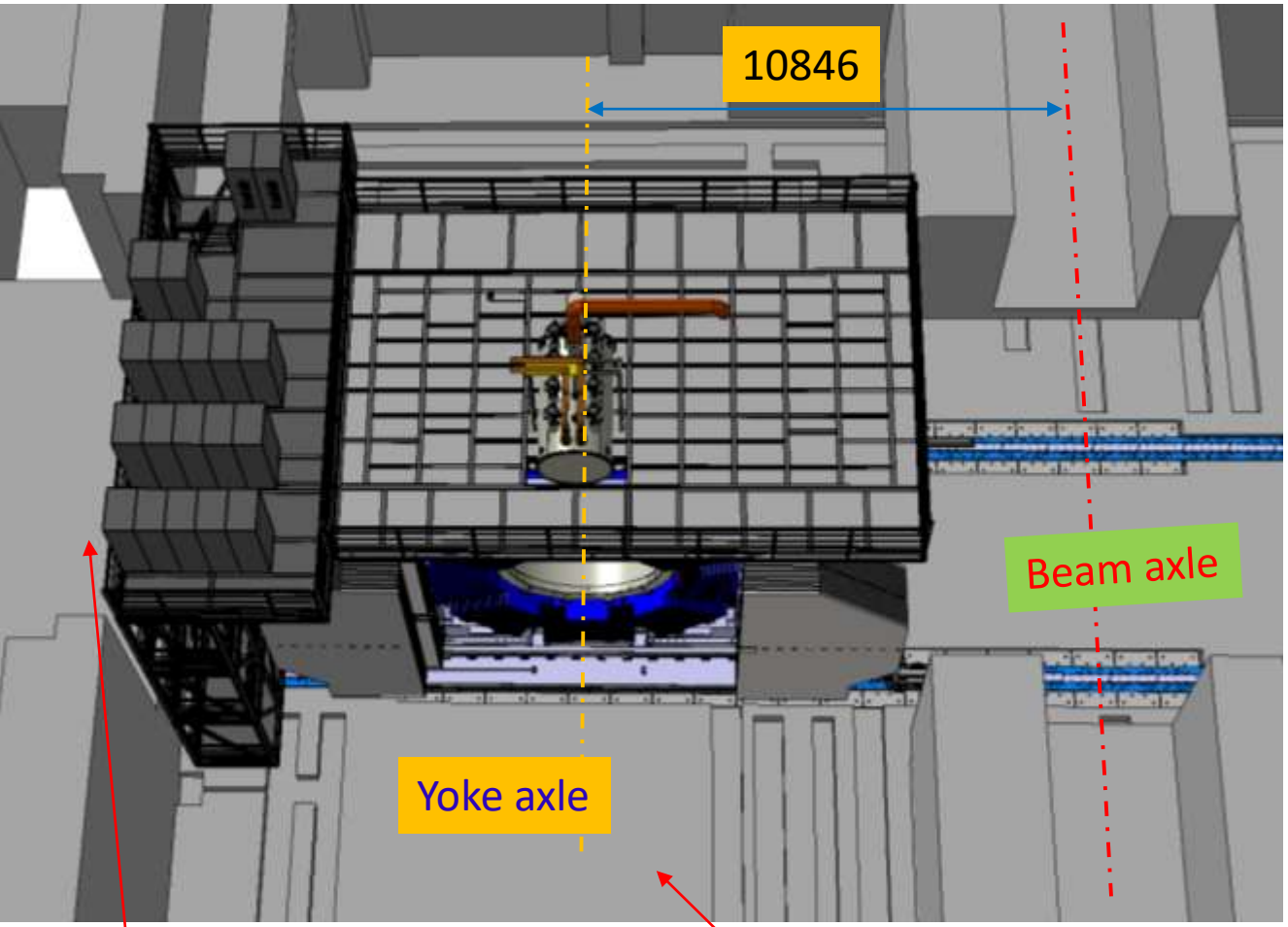


The SPD yoke's power structure and technology platform common view

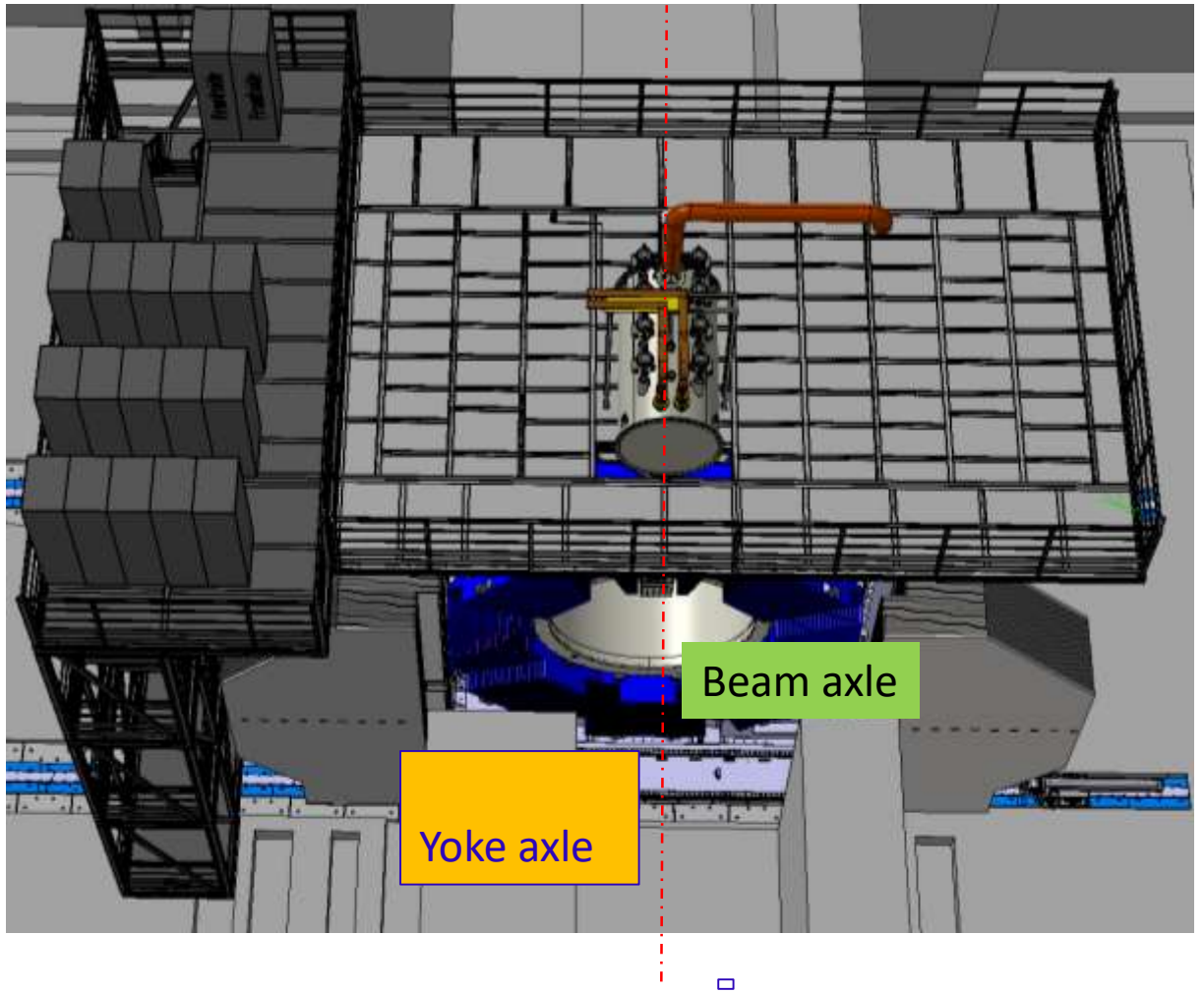


SPD yoke in the pavilion

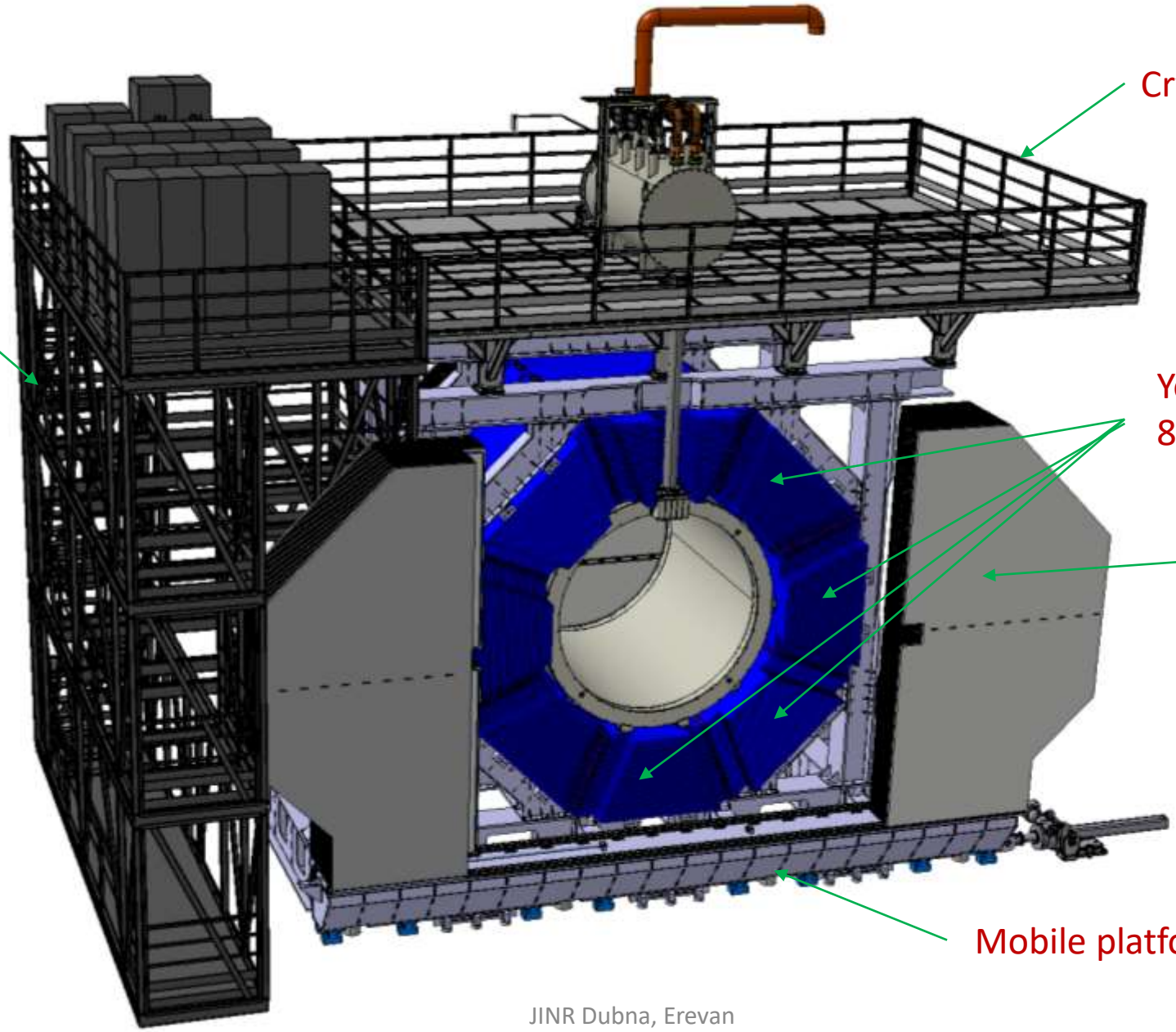
Common position



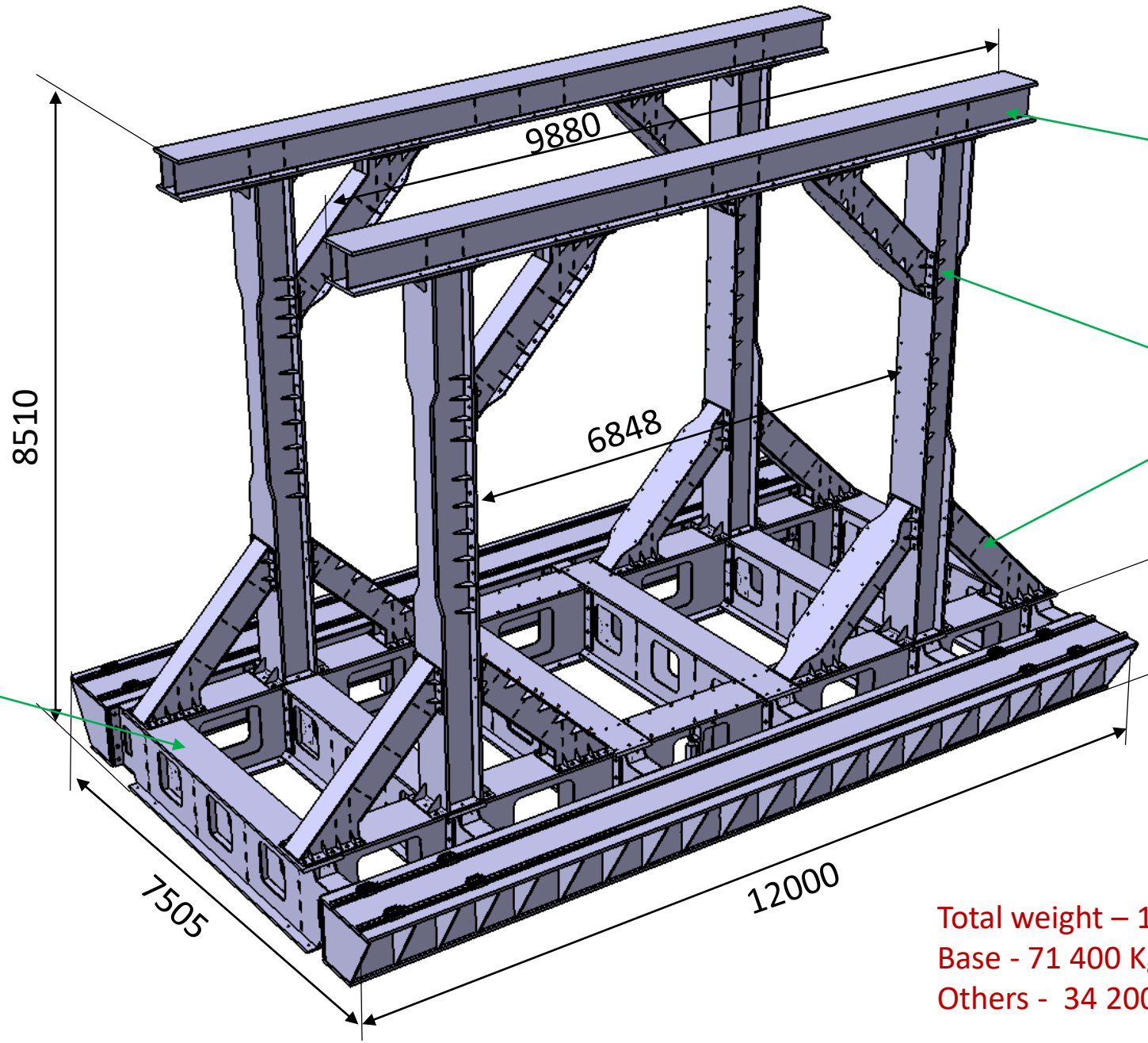
Worked position



SPD yoke main units



Mobile platform



Horizontal beam

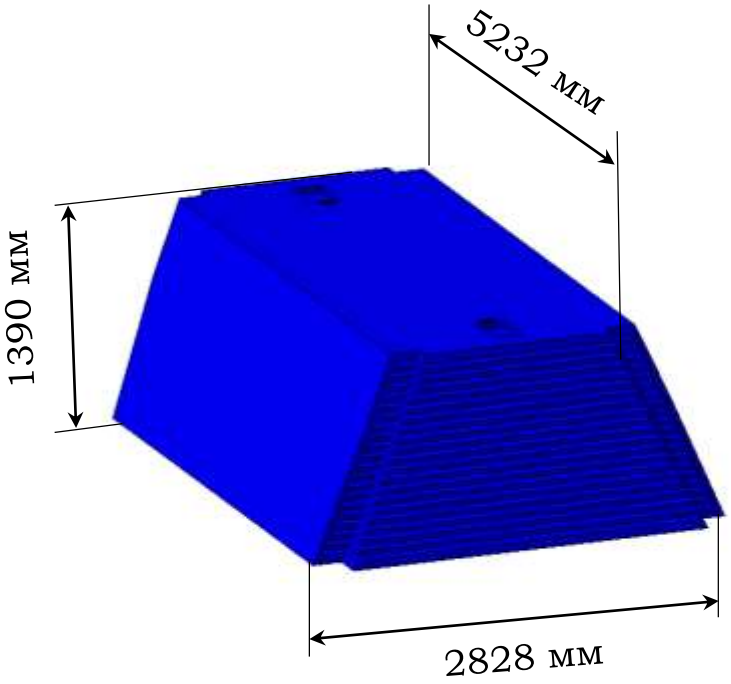
Vertical support

Beam

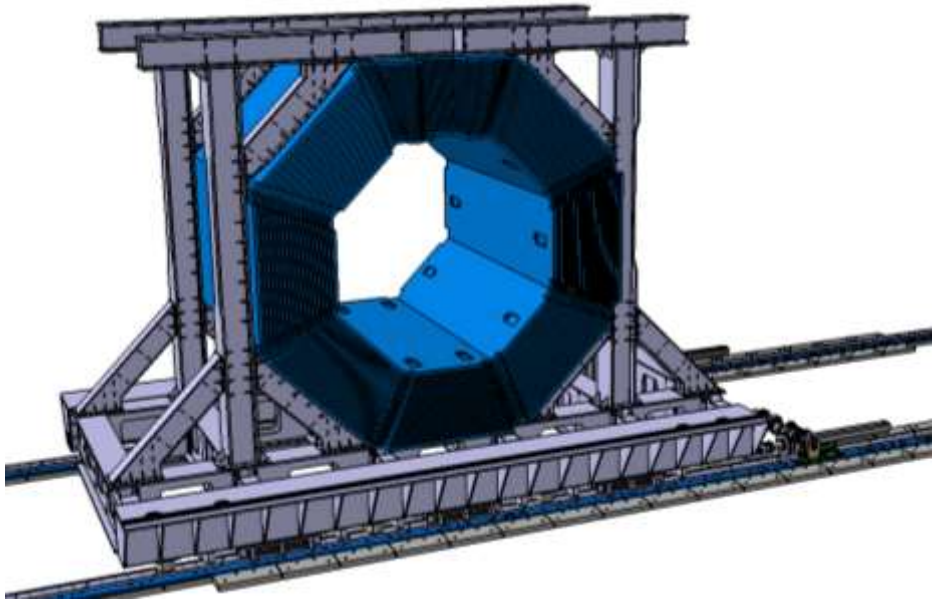
Base

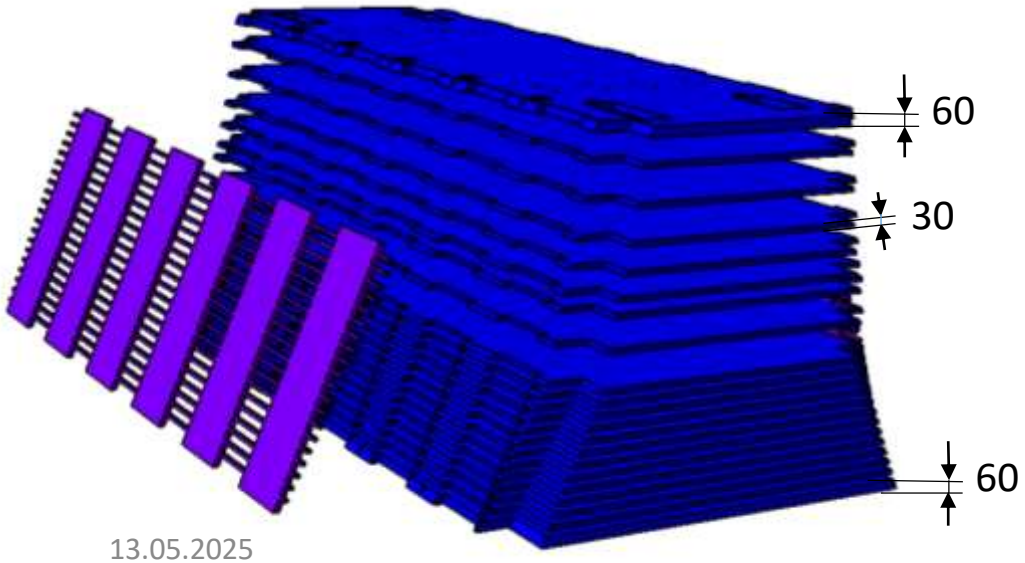
Total weight – 105600 Kg
Base - 71 400 Kg
Others - 34 200 Kg

Modules



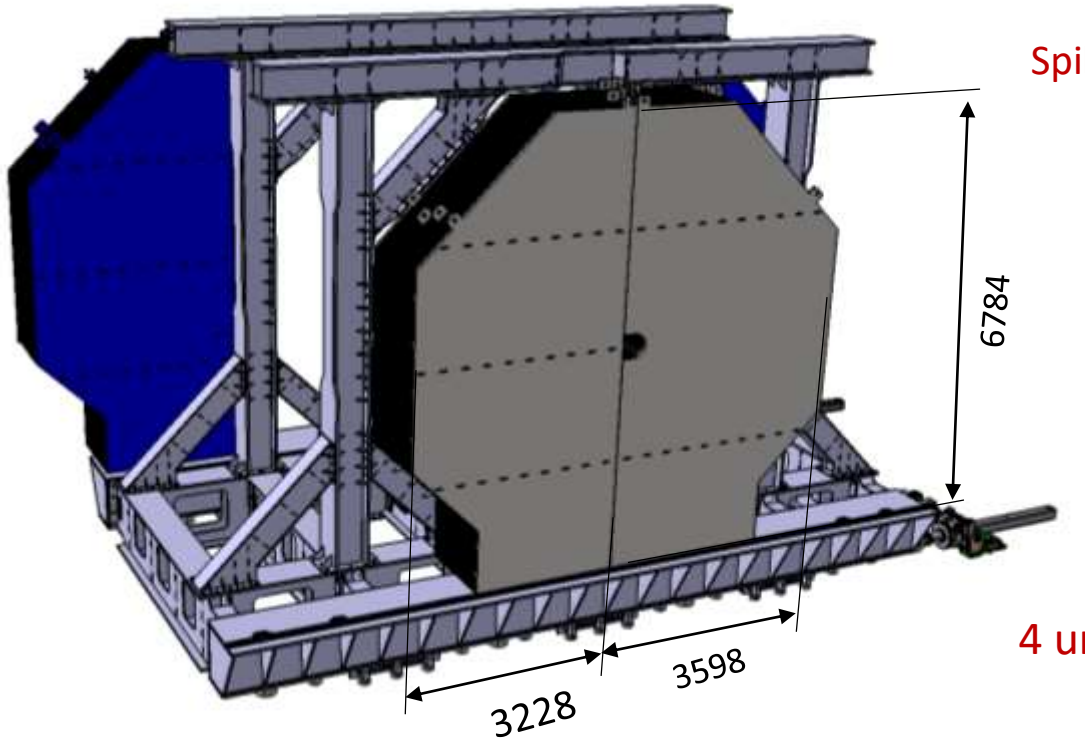
Barrel module
62 tons



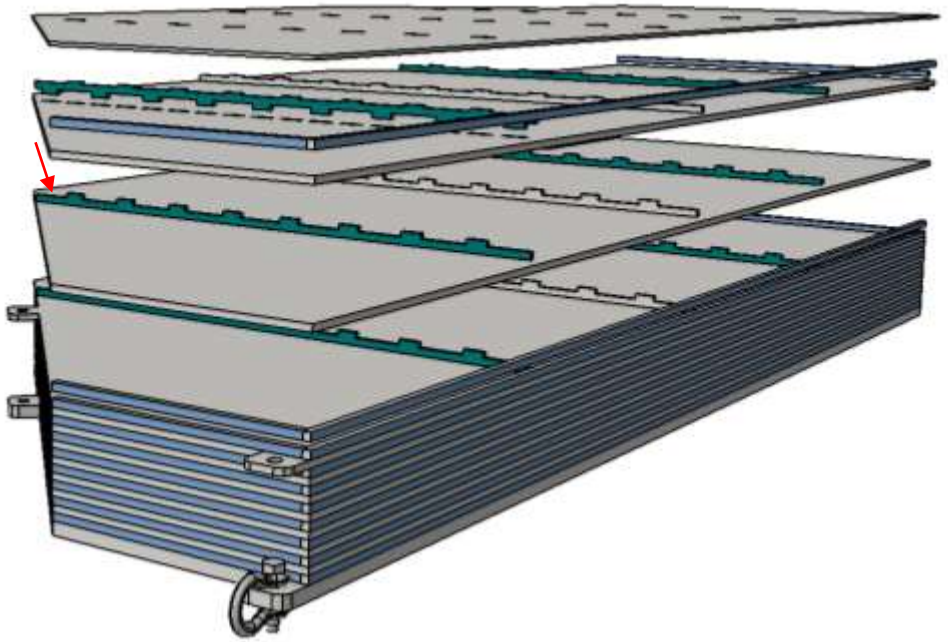


Panda module – as prototype

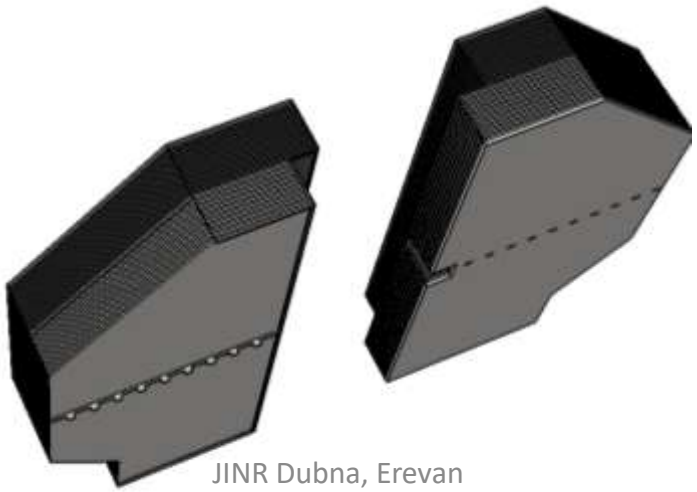
Folds of doors



Spike groove connection

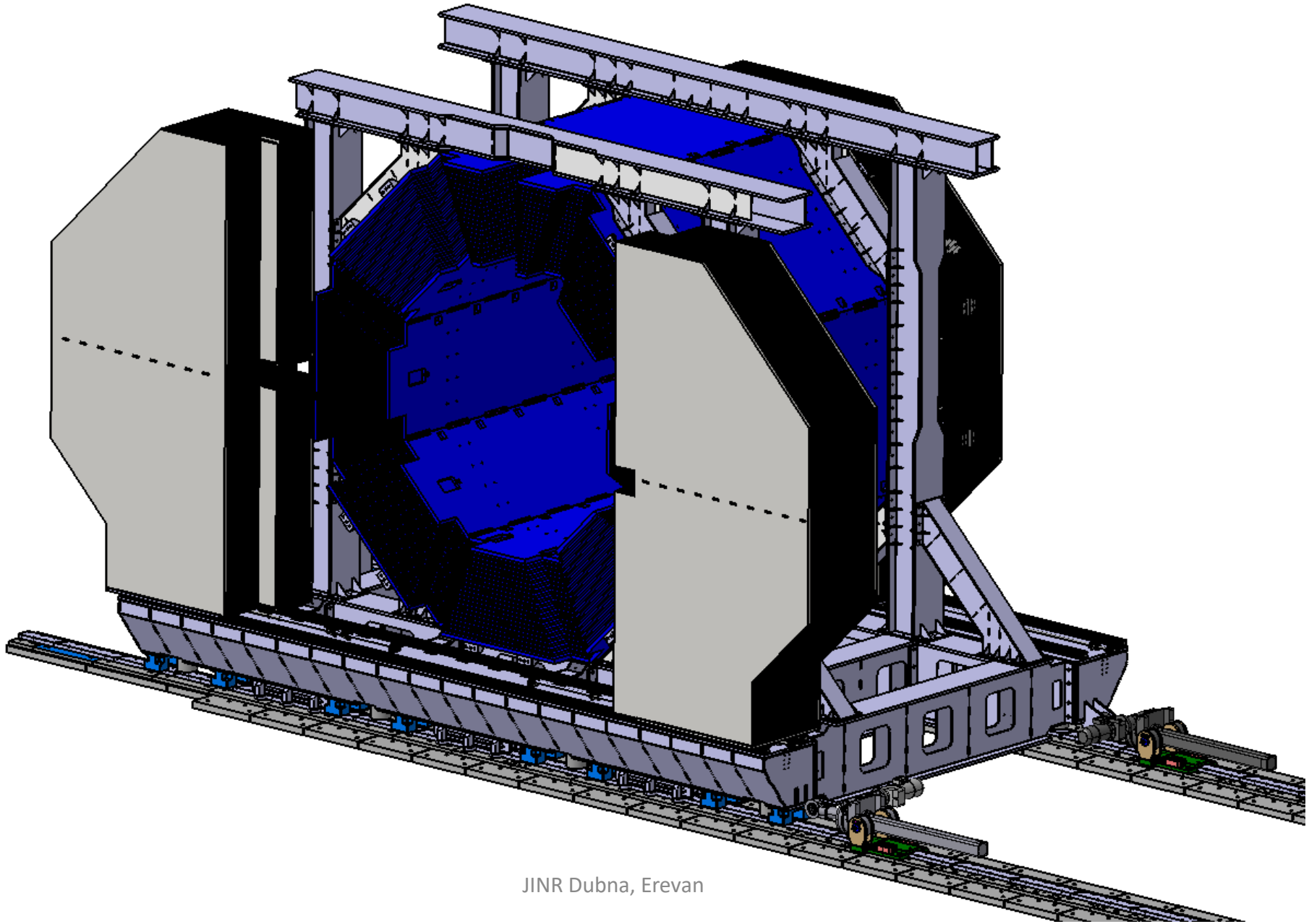


4 units of folds

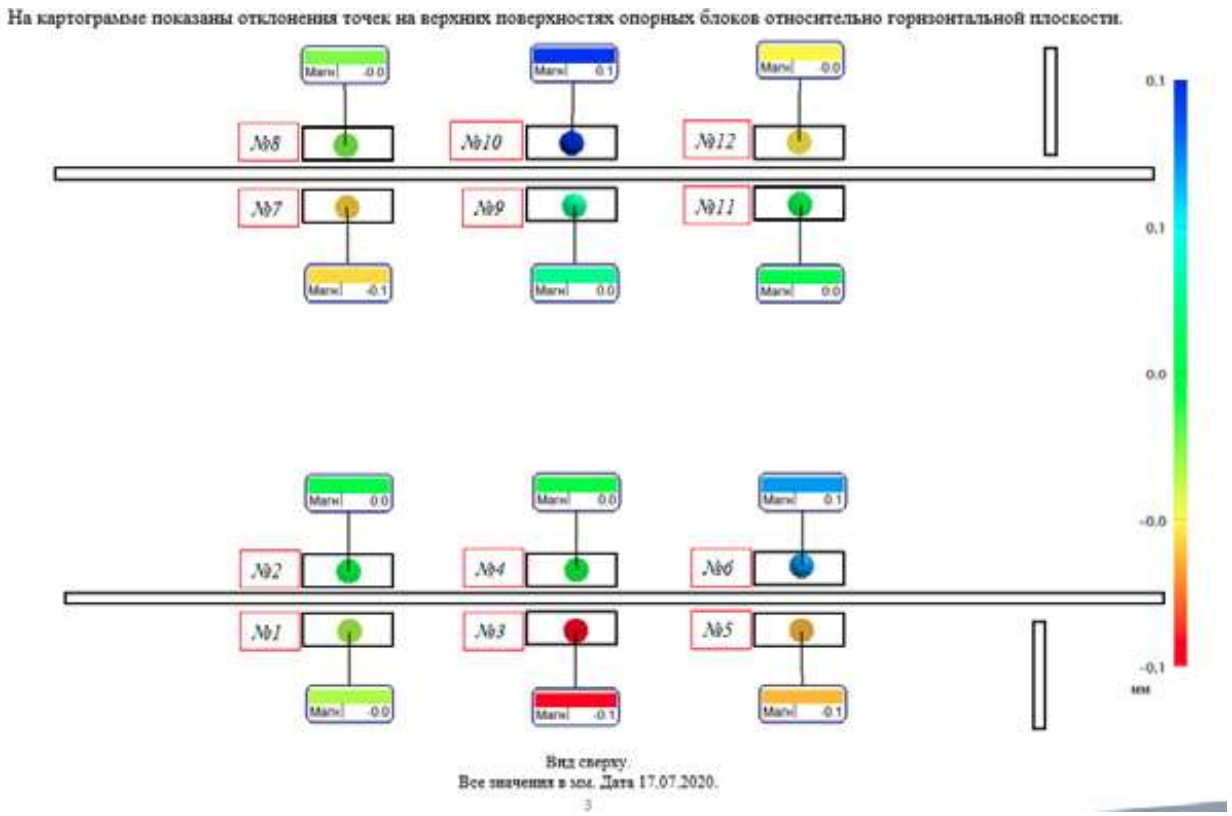


“Panda” folds

SPD yoke assembly



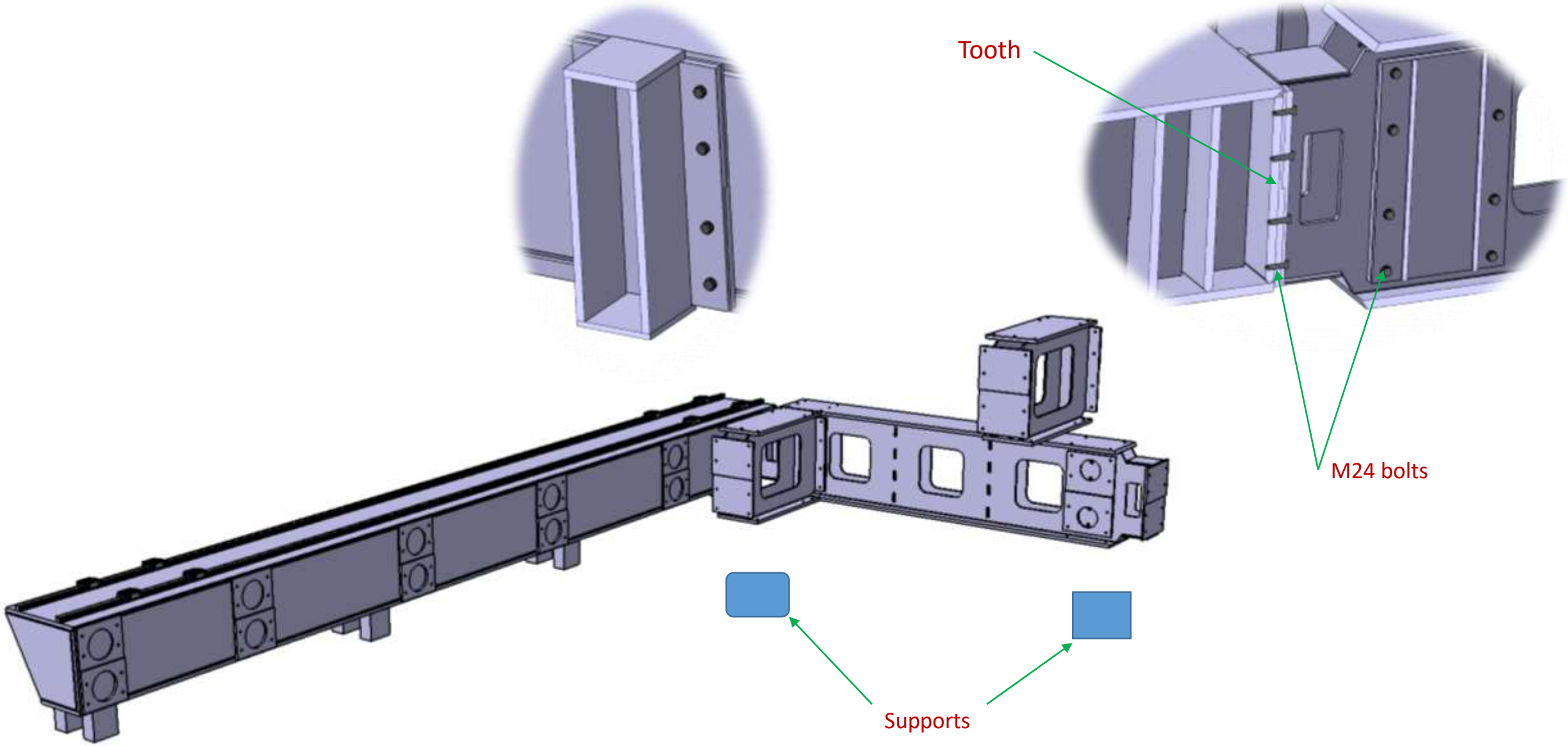
Mobile platform assembly



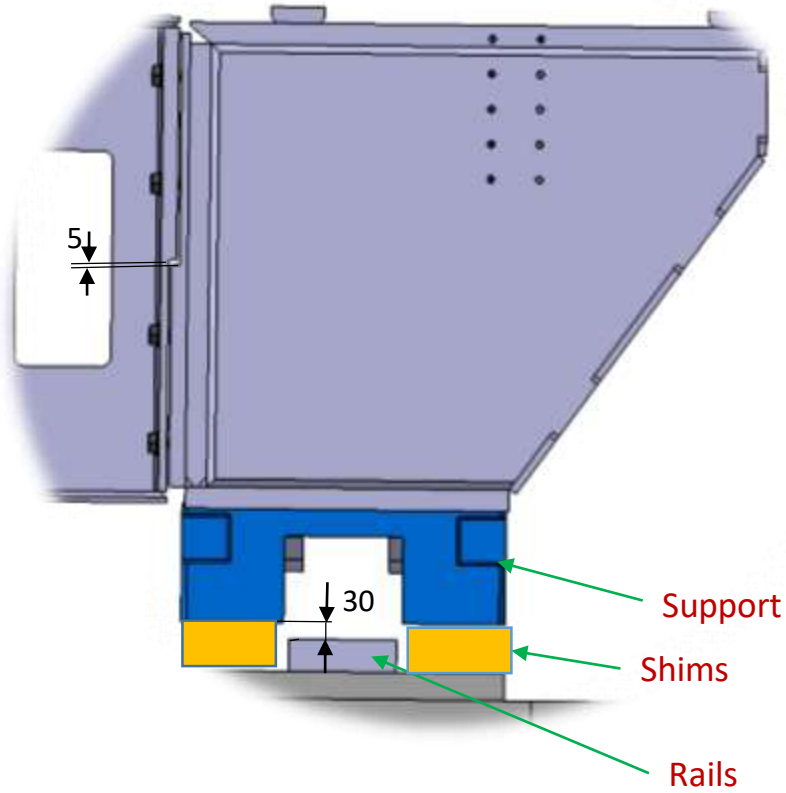
Stand with supports erected on shims
Non flatness shims top surfaces 0.1 mm

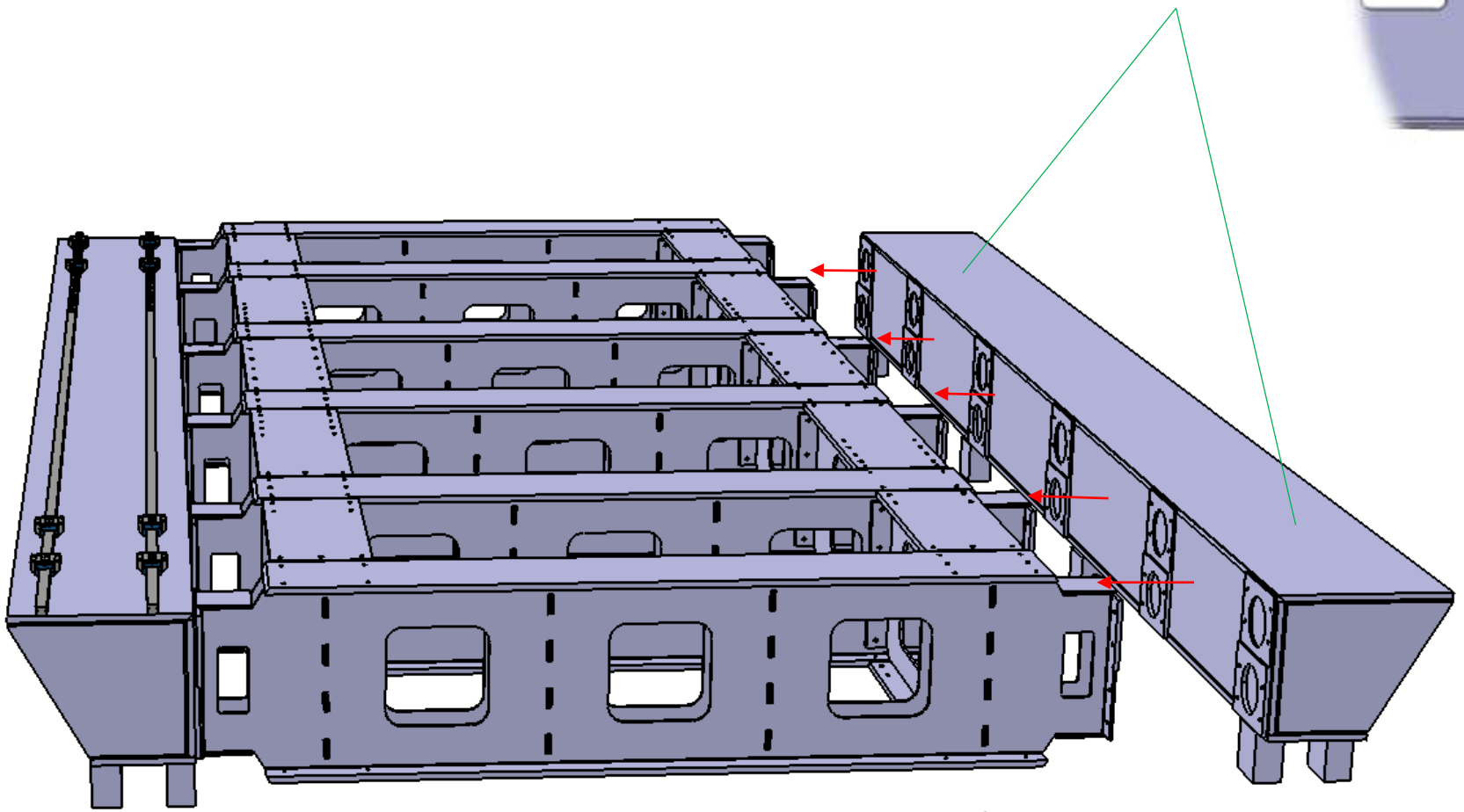
Mobile platform assembly

Beams typical connection

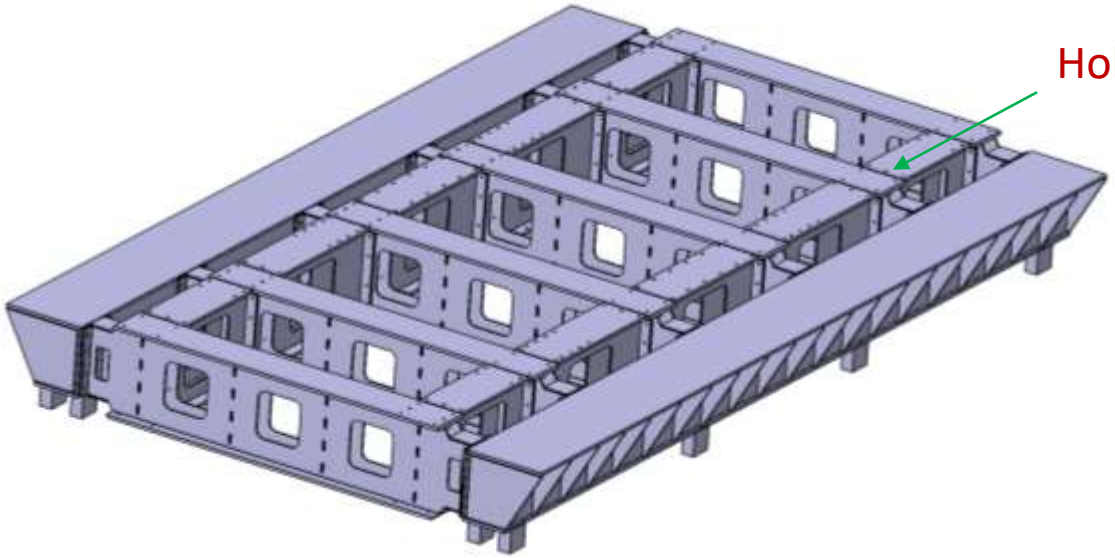


Mobile platform assembly





Mobile platform assembly

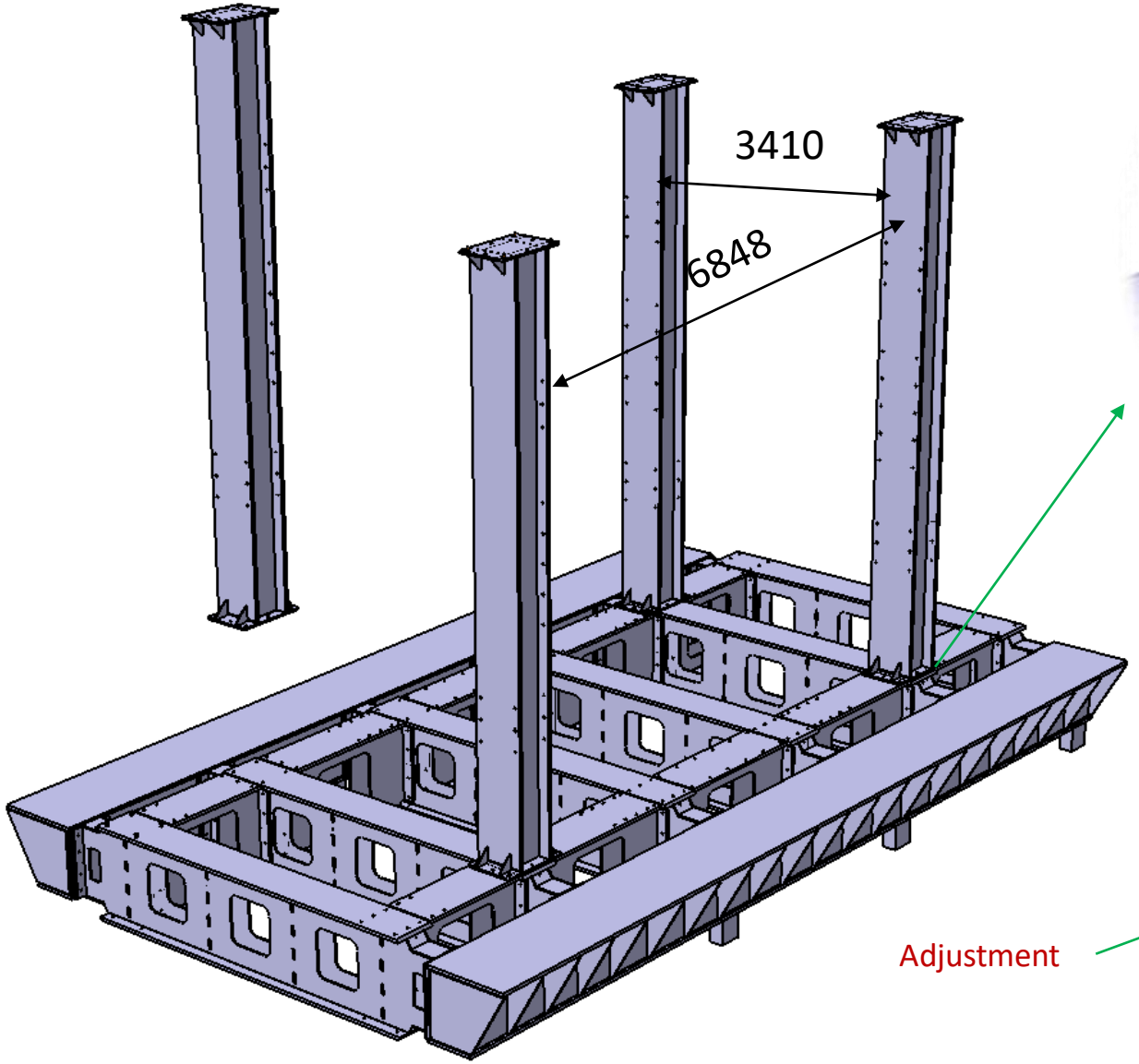


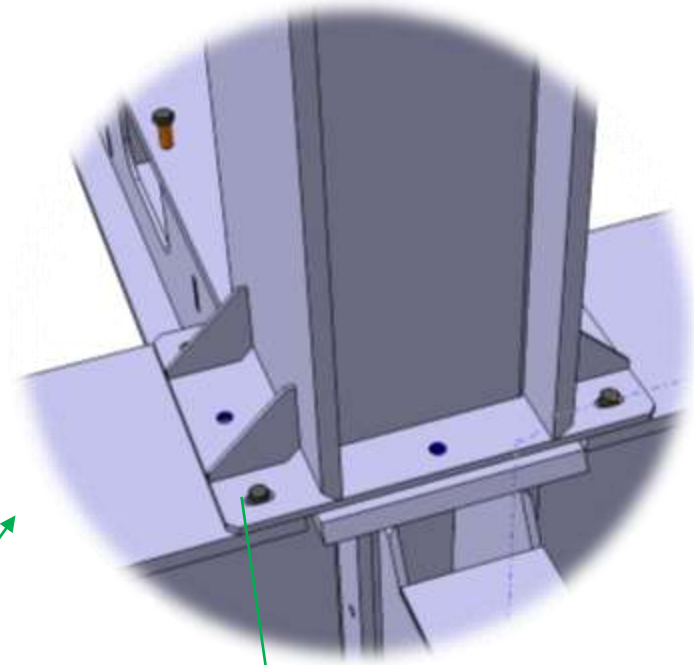
Checking top surface geometry and non flatness (tolerances 0.5 mm) and executed holes drilling M24 – 96 ps and diam. 26 mm – 16 ps.

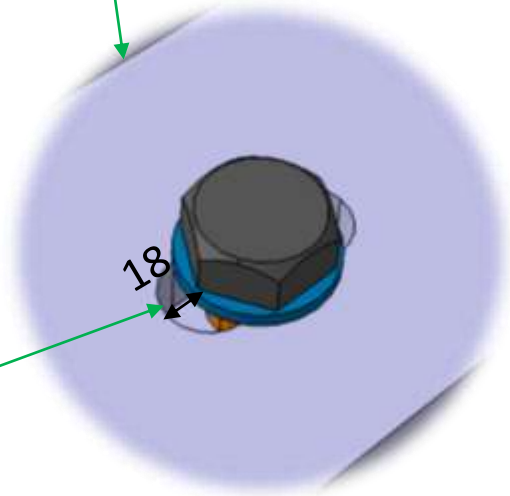
Технические характеристики 66К45МФ4	
Стол	4500x12000 мм
Грузоподъемность стола	200т
Расстояние между колоннами	5100мм
Длина обработки	13500мм
Высота обработки	4000мм
Система управления	SIEMENS

МЕХАНООБРАБАТЫВАЮЩЕЕ ОБОРУДОВАНИЕ

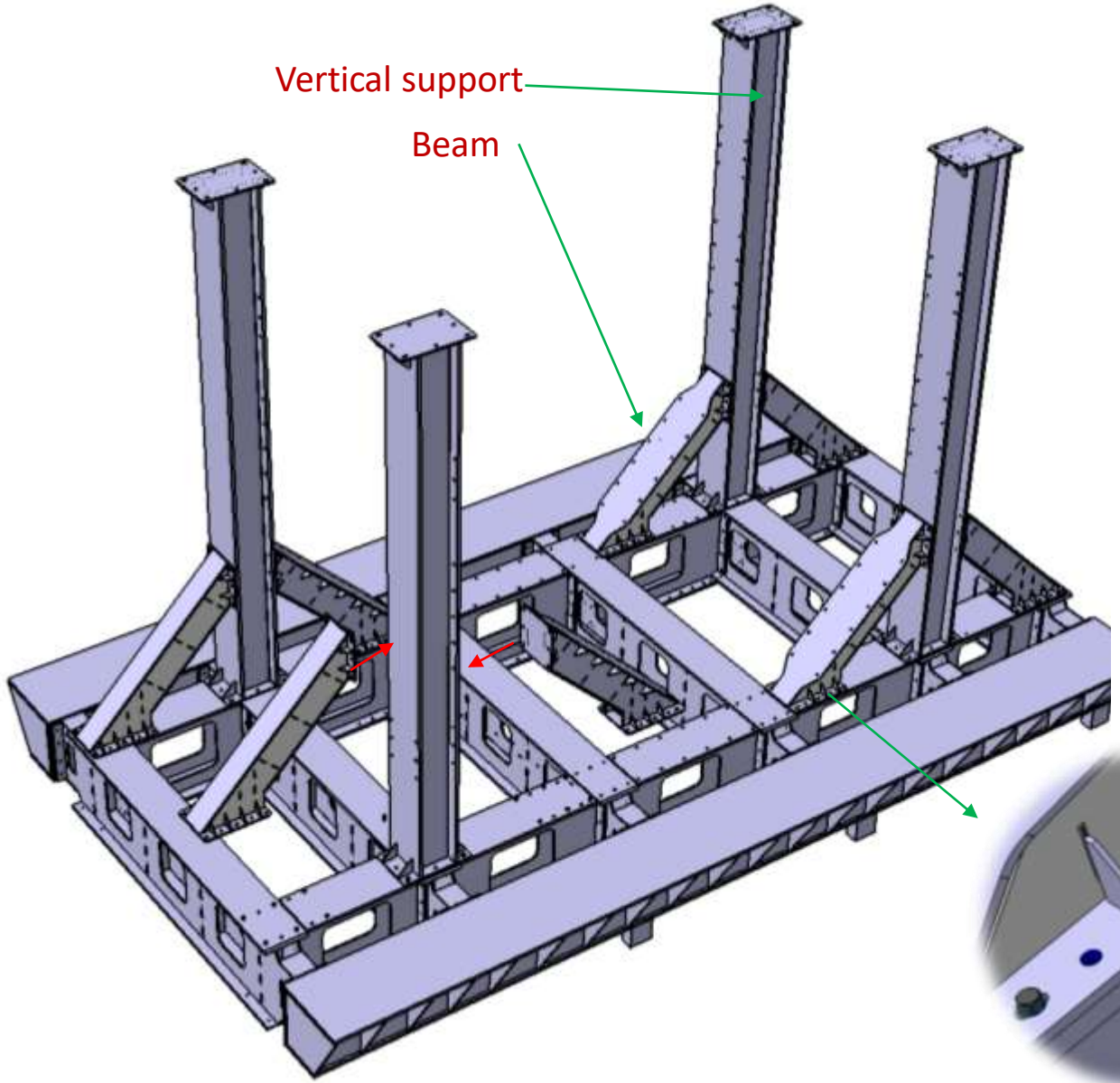
Vertical support erection on the plant

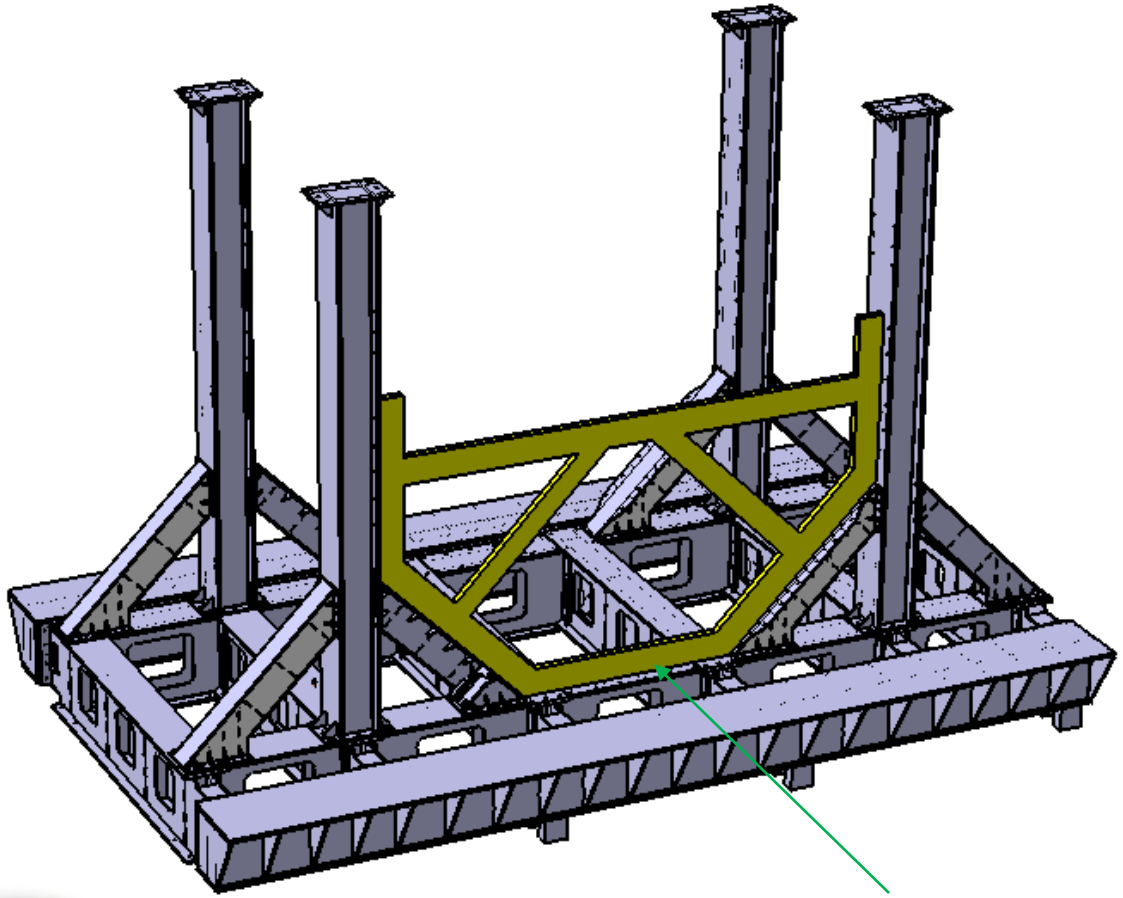




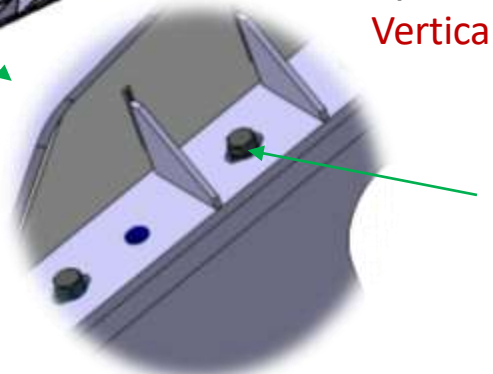


Adjustment



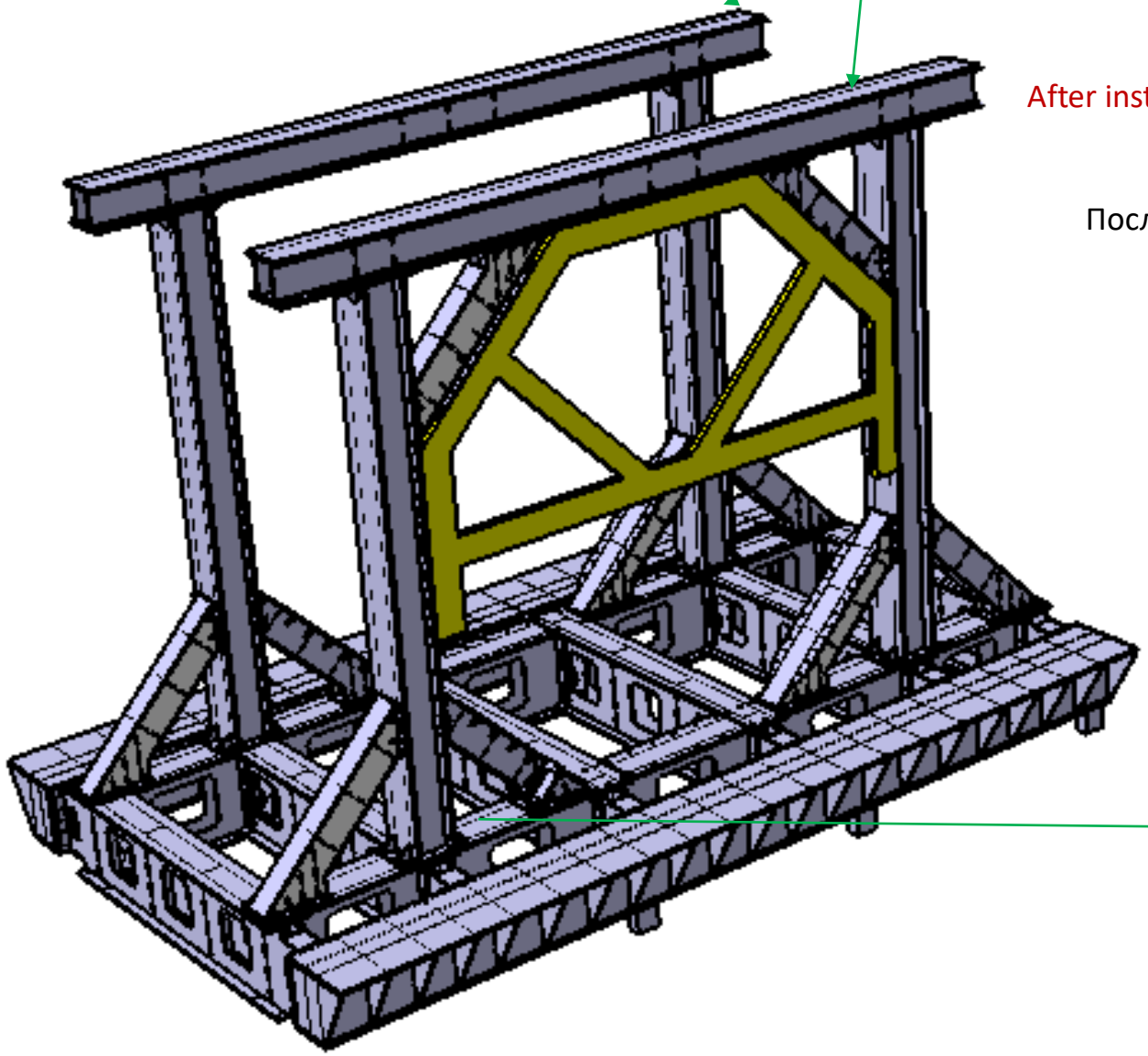


Vertical support checking perpendicularity with template



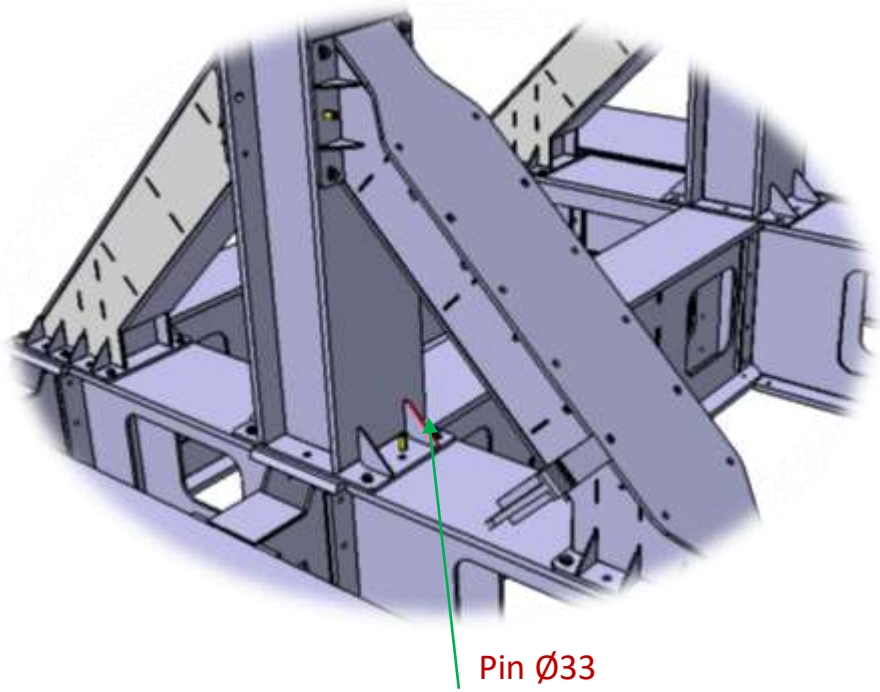
Groove for adjustment

Top beams
Верхние балки



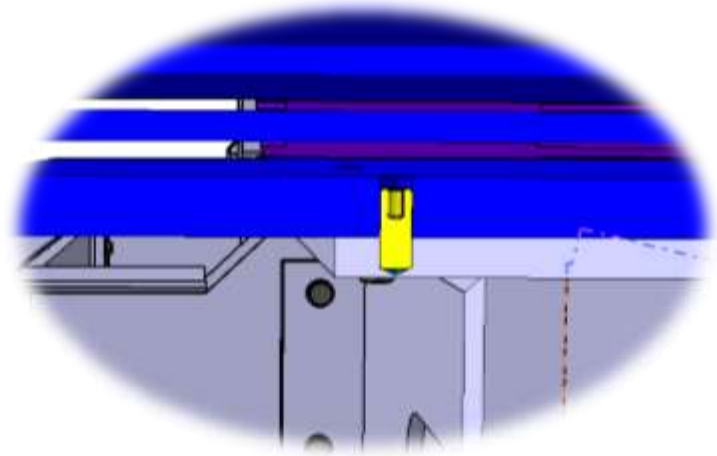
After installing the upper beams and checking the geometry of the racks, the pinning of the beams and racks is performed.

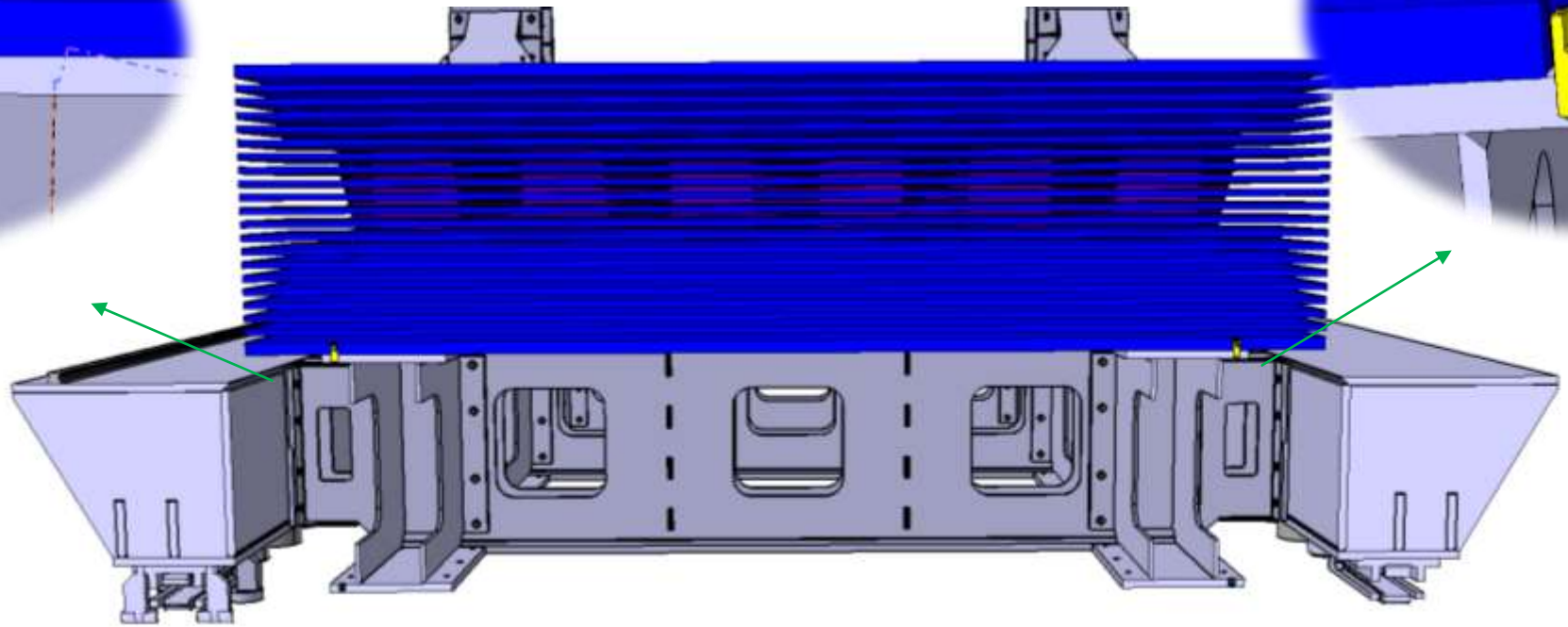
После установки верхних балок и проверки геометрии стоек, производится штифтова балок и стоек

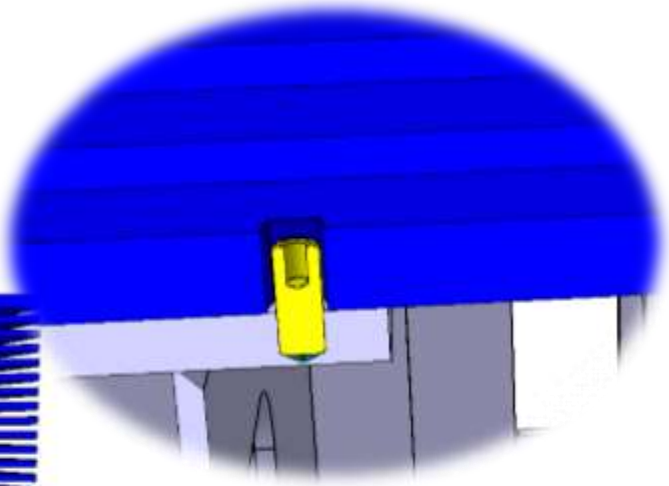


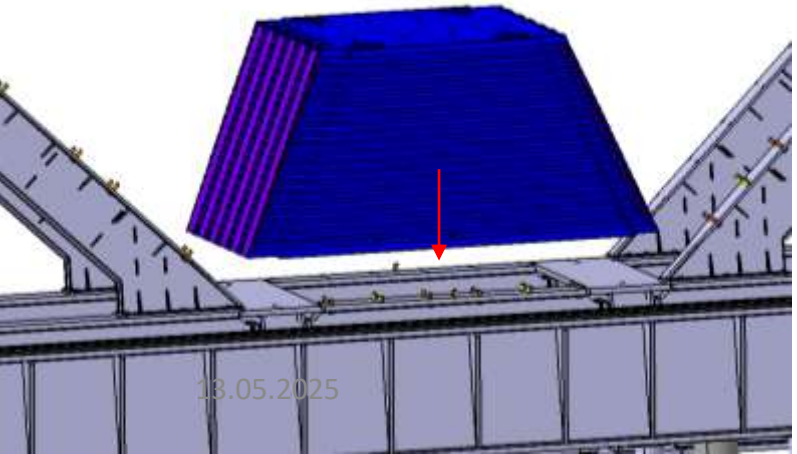
Pin Ø33
Штифт Ø33

1-st module installation

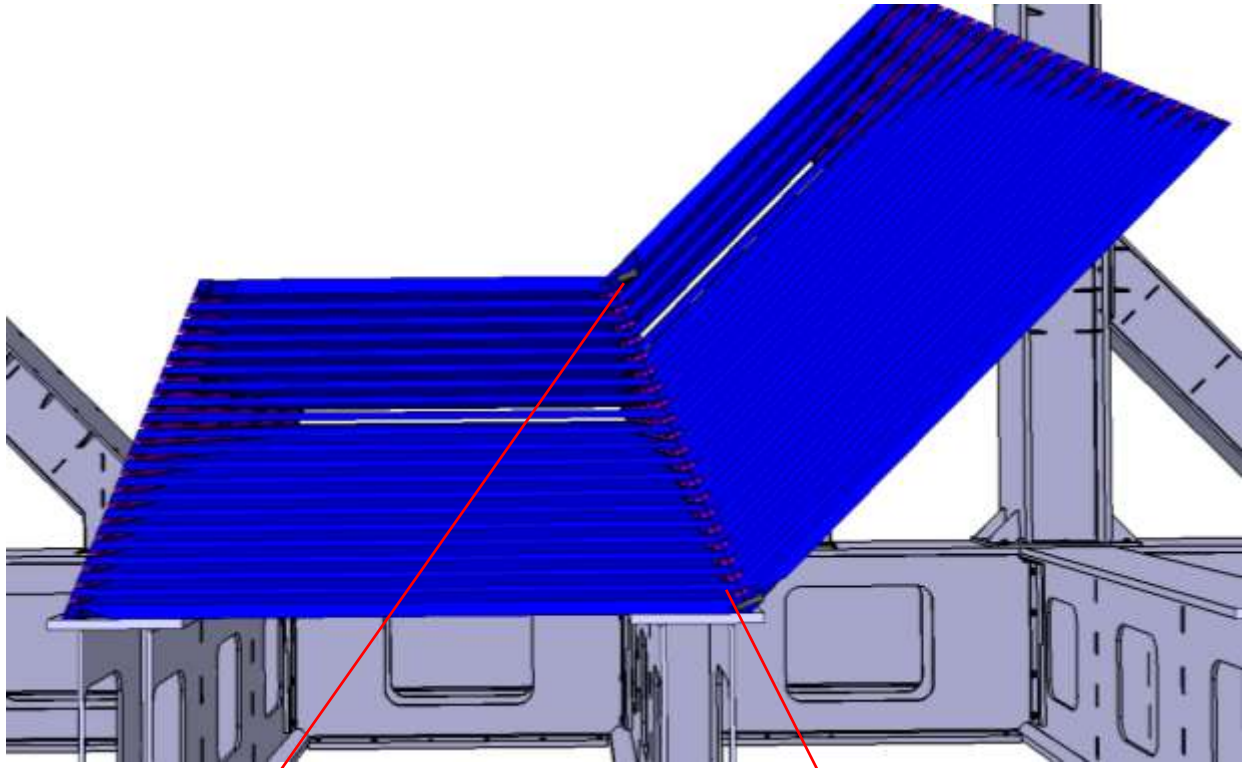


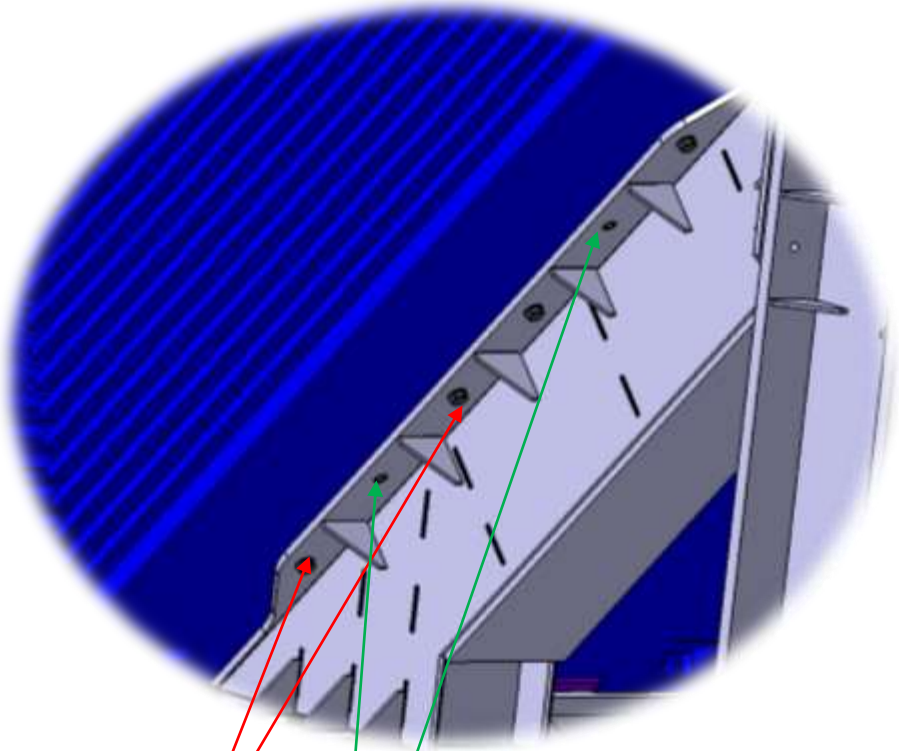






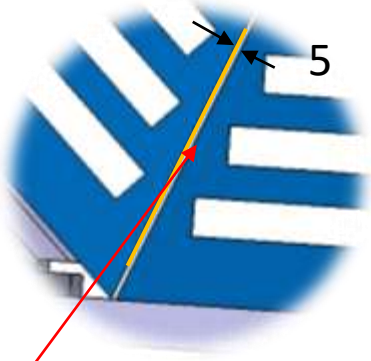
Modules installation





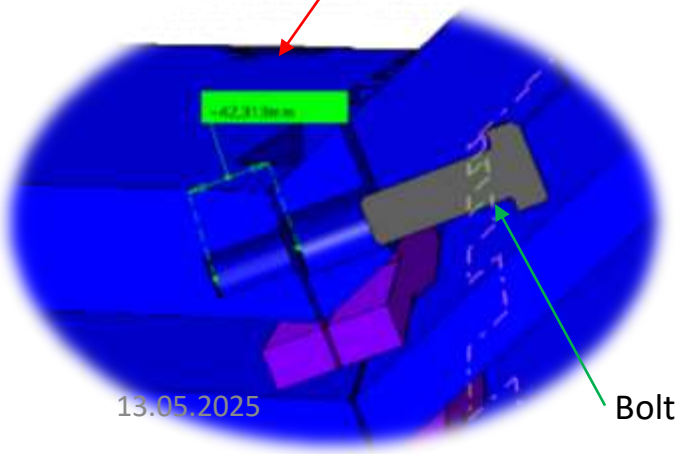
Bolts M24

Holes for pins

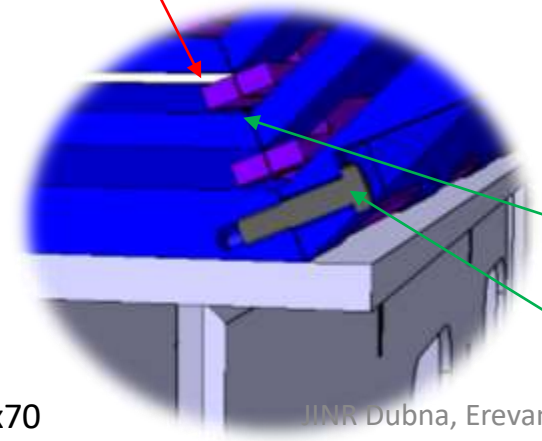


Gap between modules is 5 mm

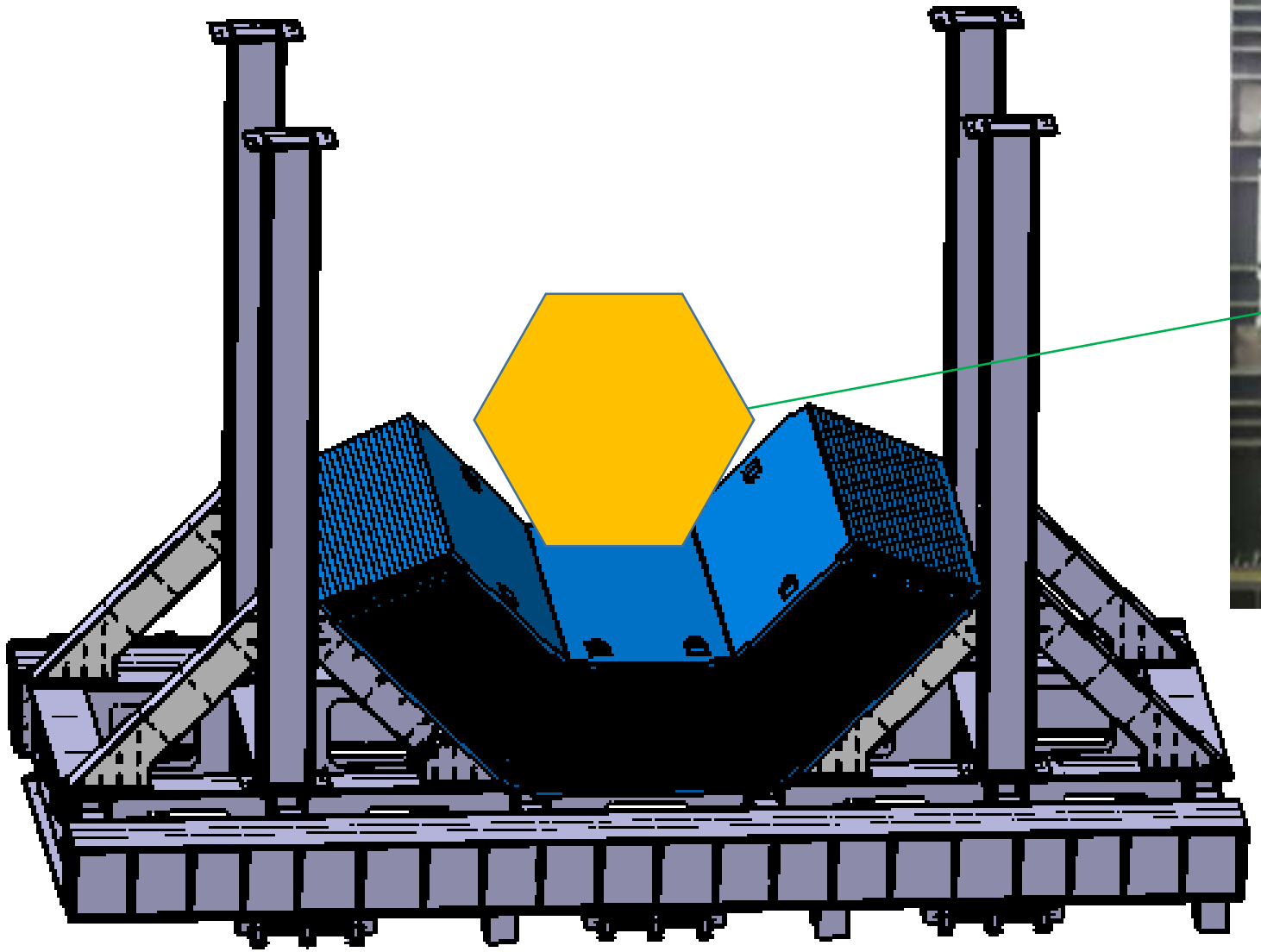
Sims set



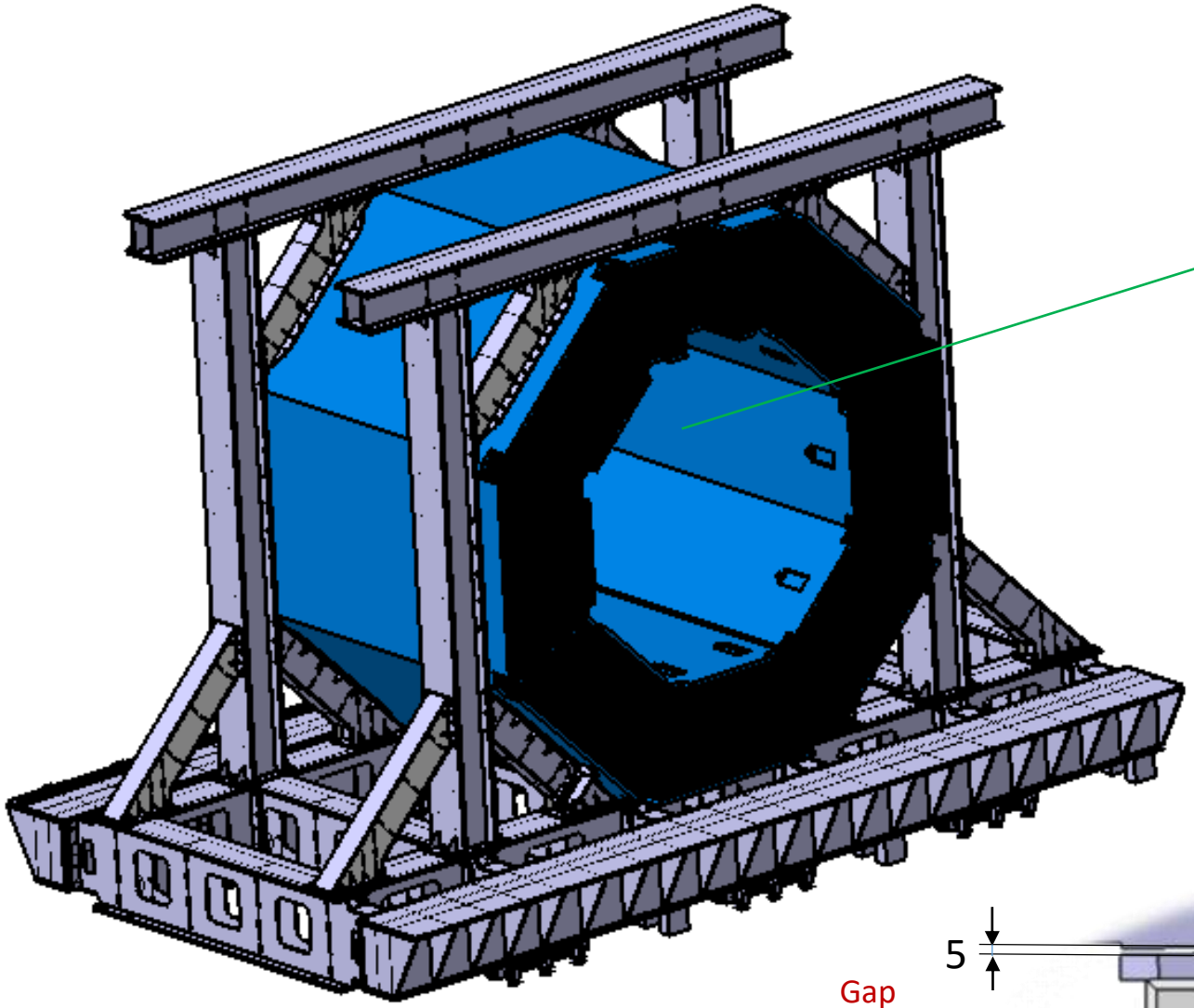
Bolt M 24x70

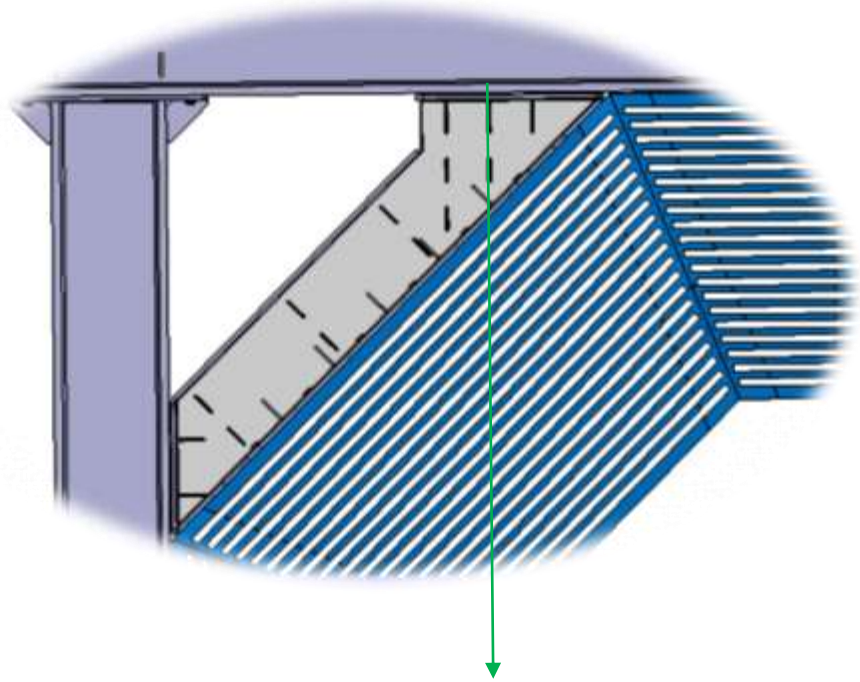


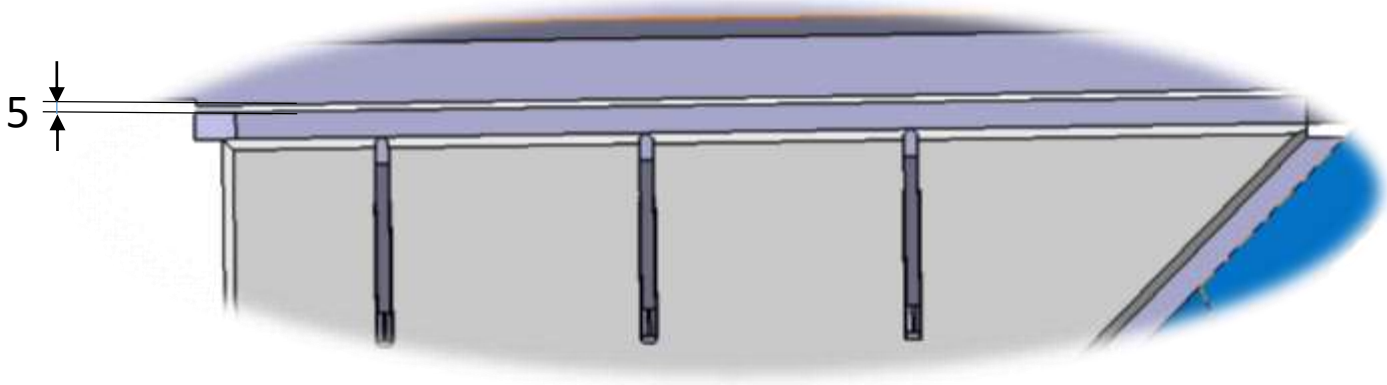
Bolt M 24x100



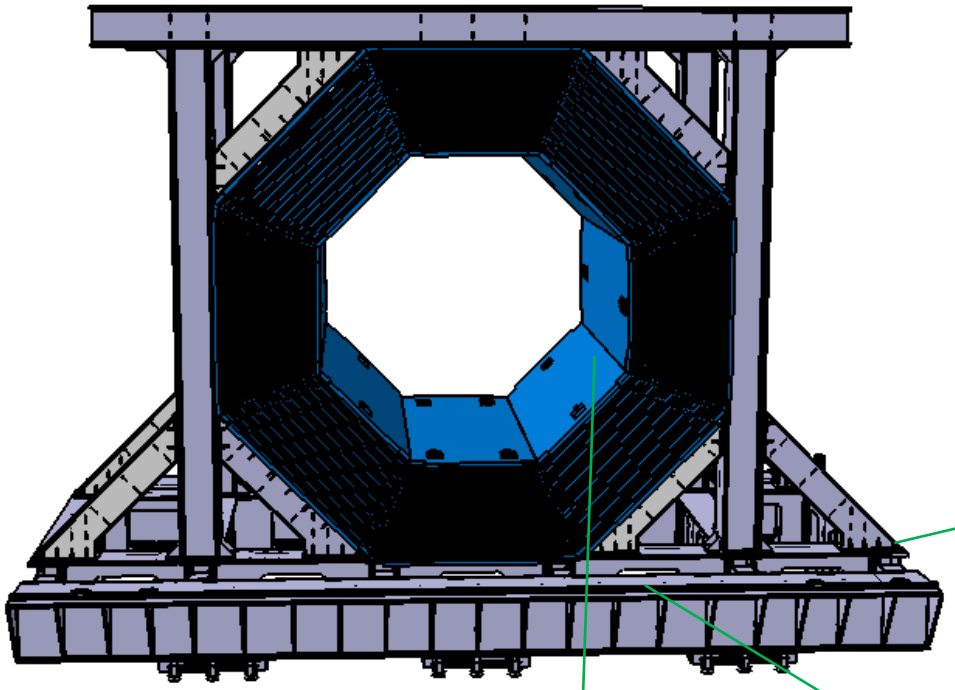
There is special frame-template for next modules fixing

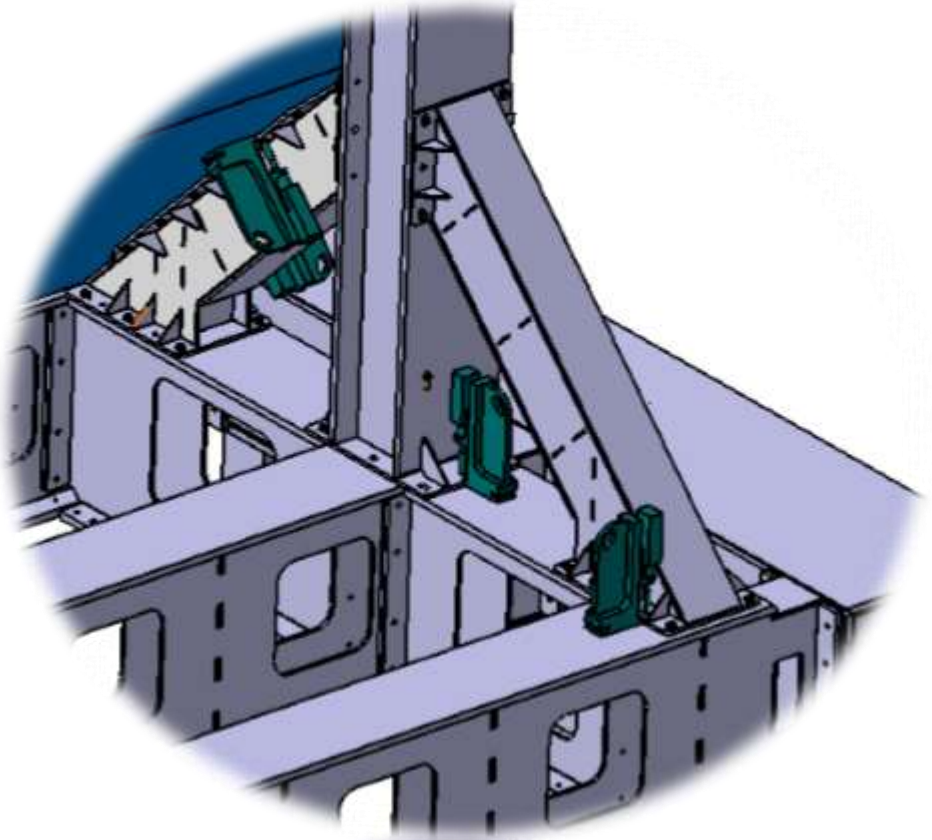


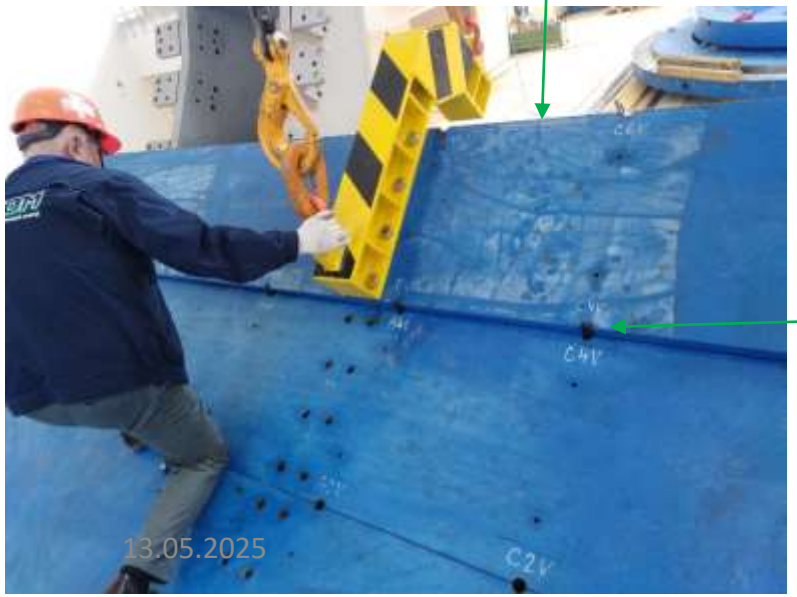




Top and lateral beams mounted with theoretical gap 5 mm

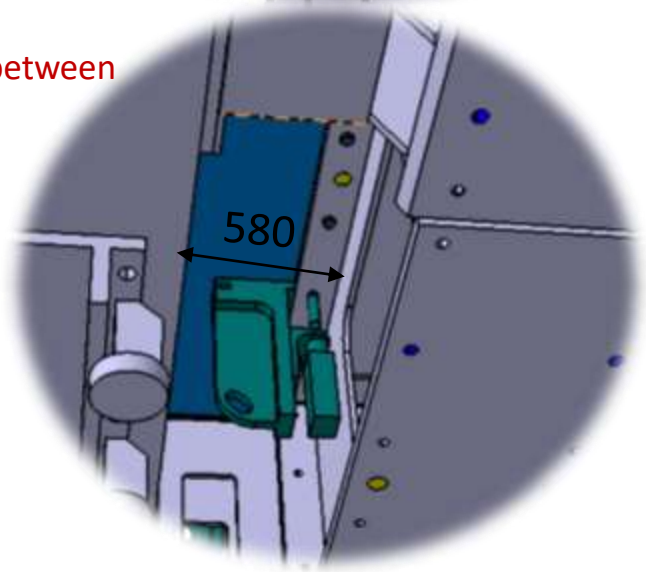




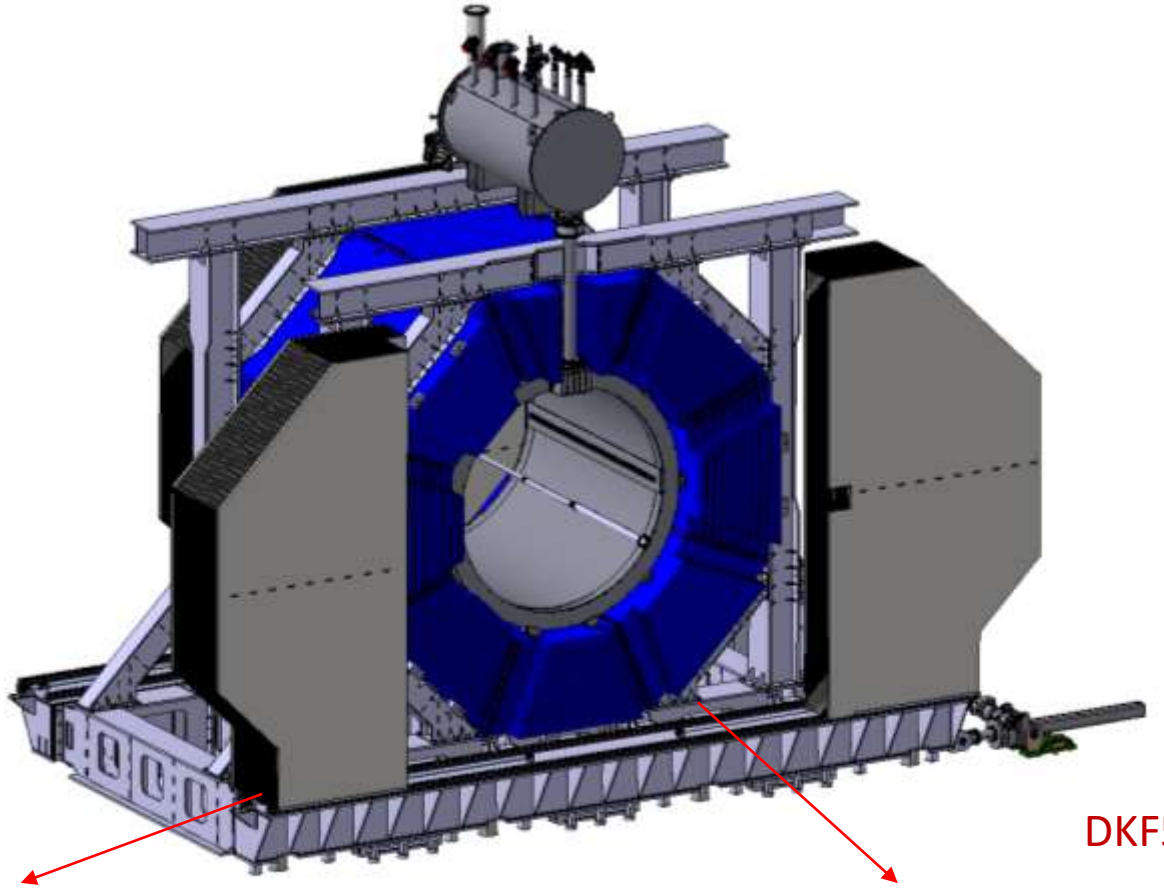


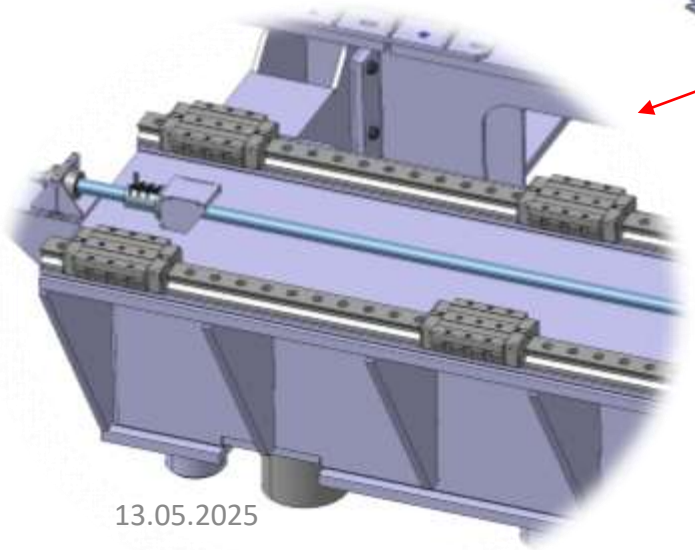
Holes drilling for pins between modules and beams

Holes for pins on MPD



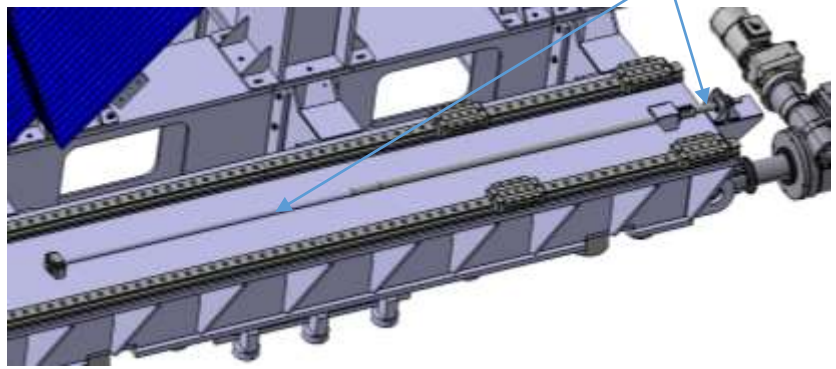
Flap movement system (components)





ШВП

DKF5012R-5-P5/5000X4754 - shaft



Roller guides

Роликовые направляющие

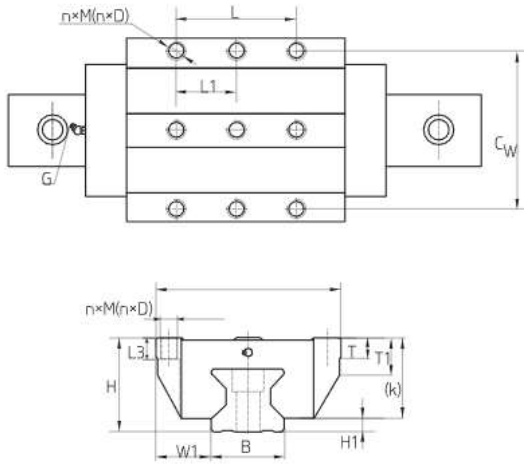
Технические характеристики

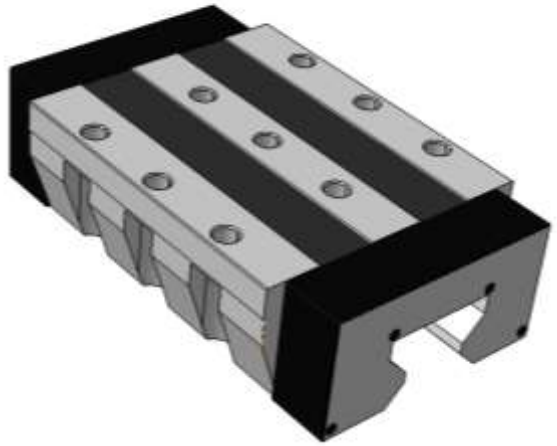
Параметр	Значение
Серия	GZB
Типоразмер	85 мм
Фланец	есть
Тип	L (увел. грузоподъемность)
Точность	4 кл.
Преднатяг	P1
Грузоподъемность стат.	945 кН
Грузоподъемность дин.	460 кН

Направление приложения момента

Типоразмеры 85..125 мм

фл

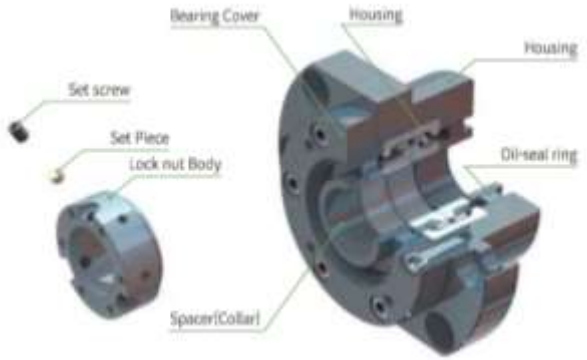


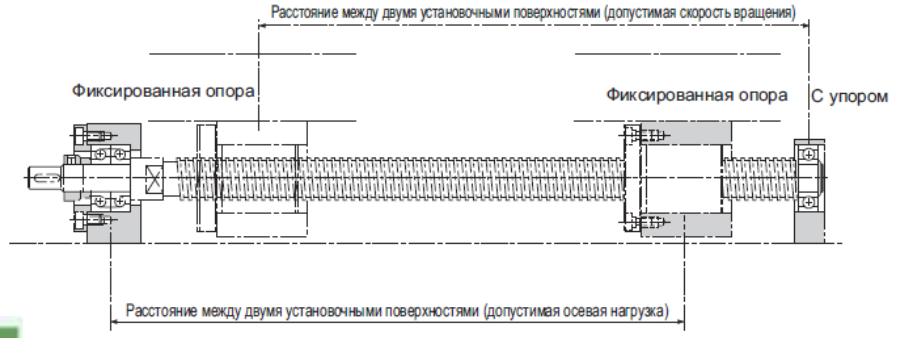


Модель	H	W1	K	W	L4	Cw	L	L1	M	D	T	T1	L3	L2	H1	B	H0	dxD1xh	F	G	P	N	C
GZB85 AAL DD P1-4	110	65	95	215	349	185	140	70	20	17.5	24	44	26	245	15	85	73	24x35x28	90	M8x1	14	21	460 кН
GZB100 AAL DD P1-4	120	75	105	250	394	220	200	100	20	17.5	25	51.5	30	286	15	100	80	26x39x32	105	M10x1	16	23	547 кН
GZB125 AAL DD P1-4	116	97.5	135.5	320	491	270	205	102.5	24	21	30	66	45	360	24.5	125	115	33x48x45	120	M10x1	16	23	1040 кН

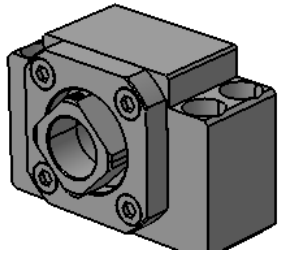
Choice a ball screw pair (BSP)
Выбор ШВП

SWBK40-DFF





BSP supports scheme
Схема опор ШВП



Support Unit For Ball Screw (High Load)

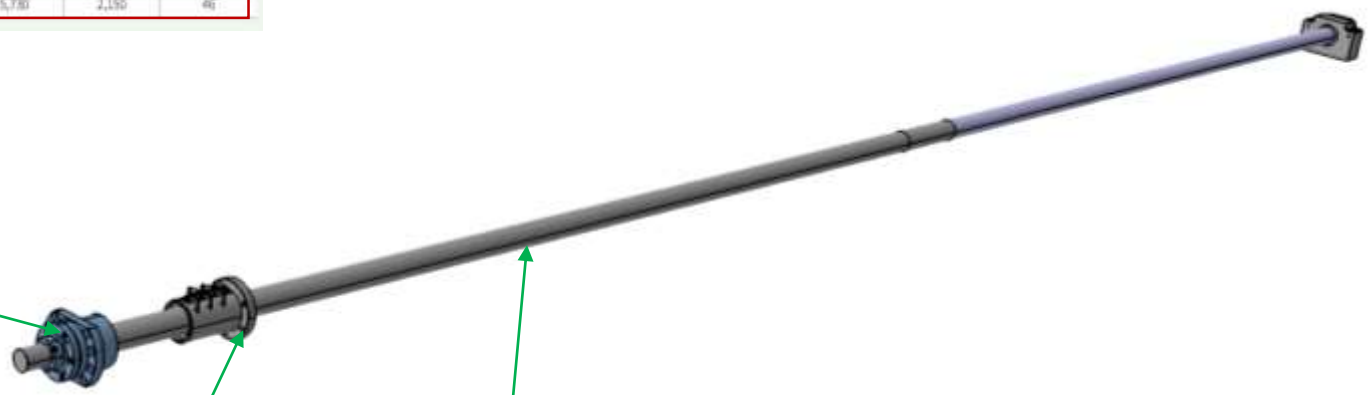
List of Bearings

Model	Bearing Combinations	Bearing	Basic Dynamic Load [N]	Permissible Axial Load [N]	Preload [N]	Axial Rigidity [N/μm]	Starting Torque [N·cm]
SWBK17	DF	17TAC47C	23,000	28,000	1,400	630	14
SWBK30	DFF	35TAC T2C	53,000	100,000	5,490	2,060	43
SWBK40	DF	40TAC T2C	33,500	52,000	2,860	1,080	28
SWBK40	DFD	40TAC T2C	54,000	104,000	3,900	1,490	36
SWBK40	DFF	40TAC T2C	54,000	104,000	5,730	2,150	46

Номера моделей подшипников и технические параметры

Шариковый подшипник в фиксированной части					Шарикоподшипник с углубленной канавкой в плавающей части			
		Осевое направление					Радиальное направление	
Кодовое обозначение опоры (номер модели)	Номер модели подшипника	Номинальная динамическая грузоподъемность Ca (кН)	Примечание) Допустимая нагрузка (кН)	Жесткость (Н/мкм)	Кодовое обозначение опоры (номер модели)	Номер модели подшипника	Номинальная динамическая грузоподъемность C(кН)	Номинальная статическая грузоподъемность C0(кН)
EK 4 FK 4	AC4-12P5	0,93	1,1	27	—	—	—	—
BK 40	7208HTDF GMP5	44,1	27,1	270	BF 40	6208ZZ	29,1	17,8

Примечание) "Допустимая нагрузка" означает допустимую статическую грузоподъемность.



SWBK40-DFF

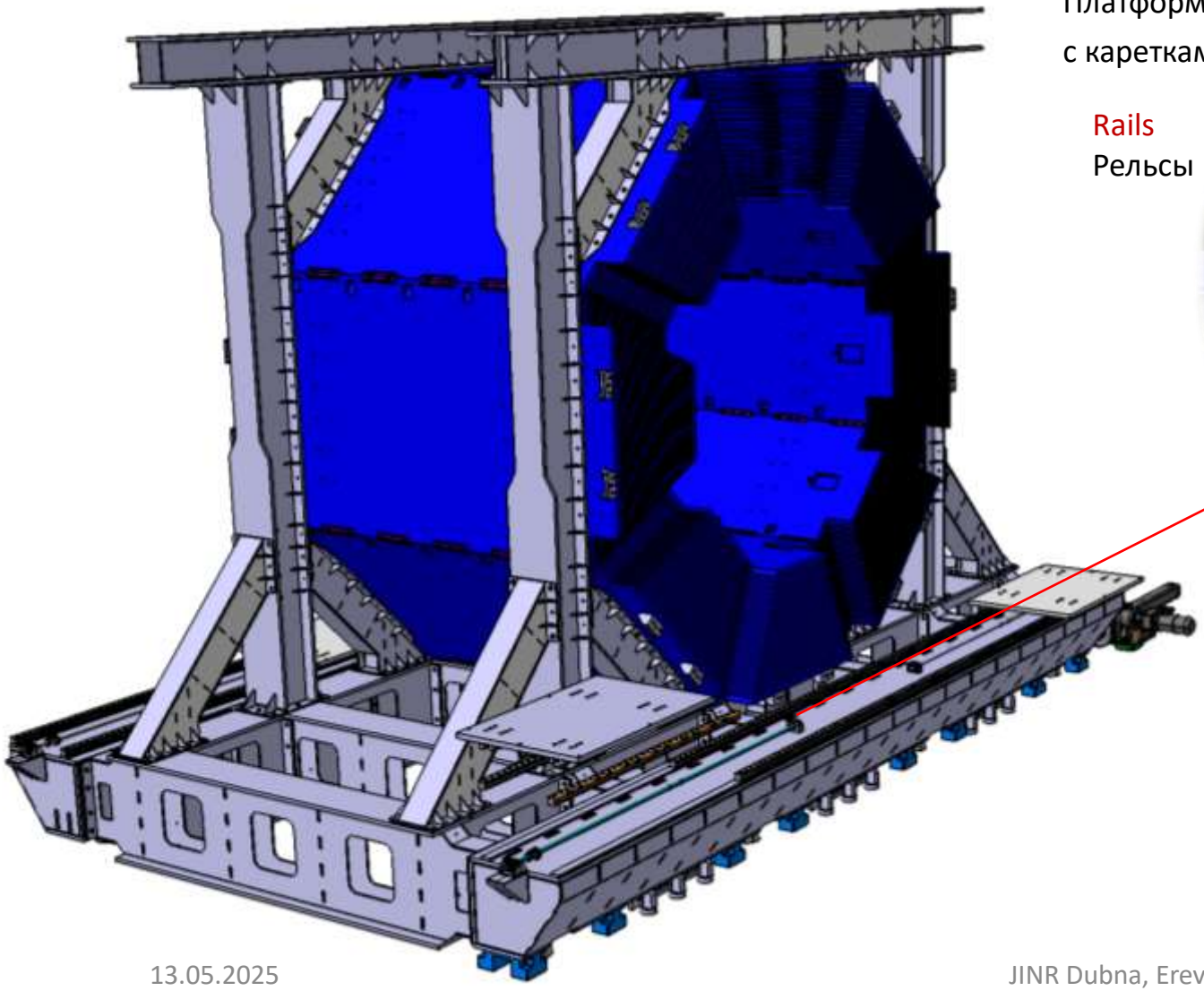
BK-40

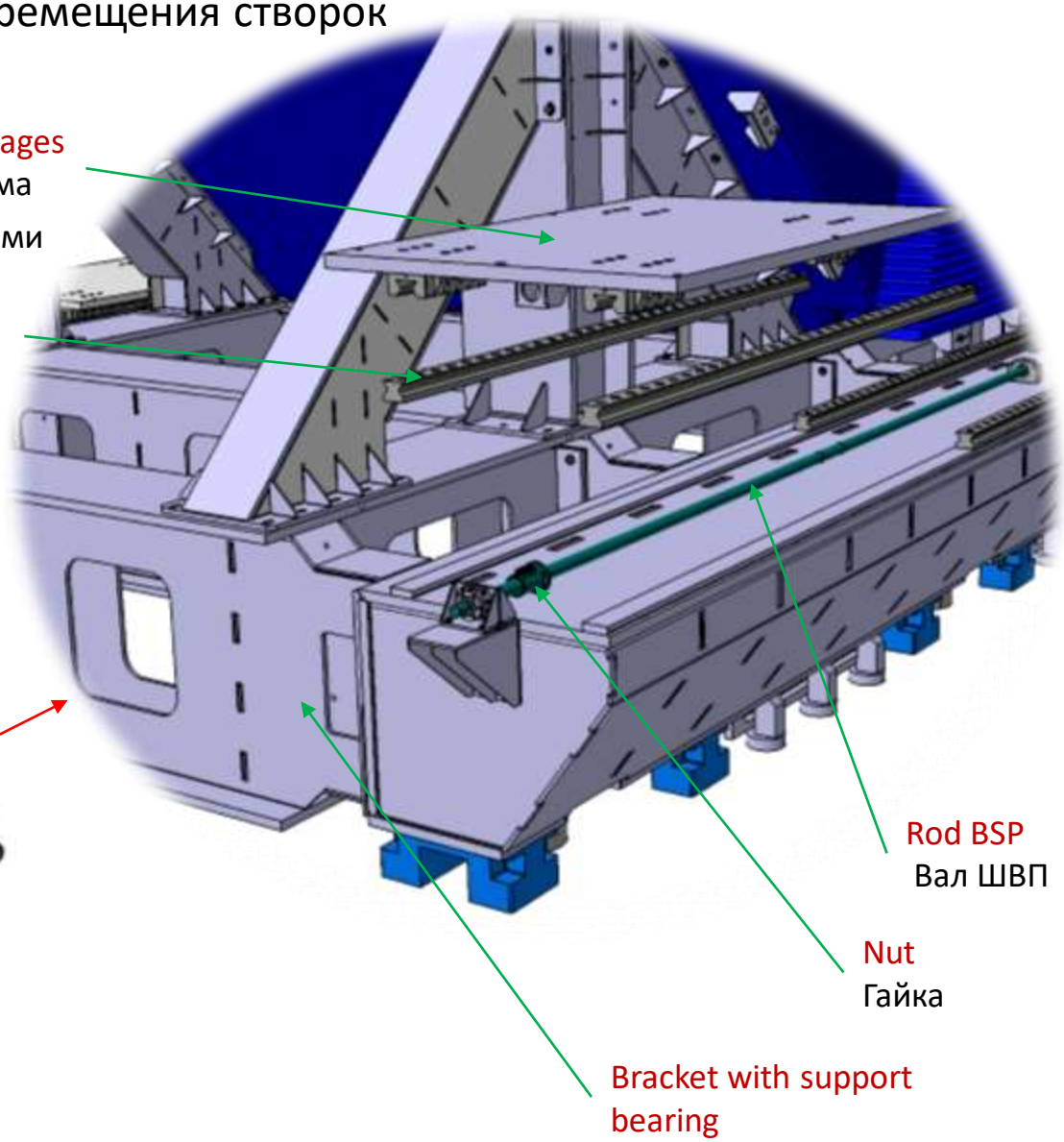
DKF5012R-5

DKF5012R-5-P5/5000X4754

Mounting fold moving system

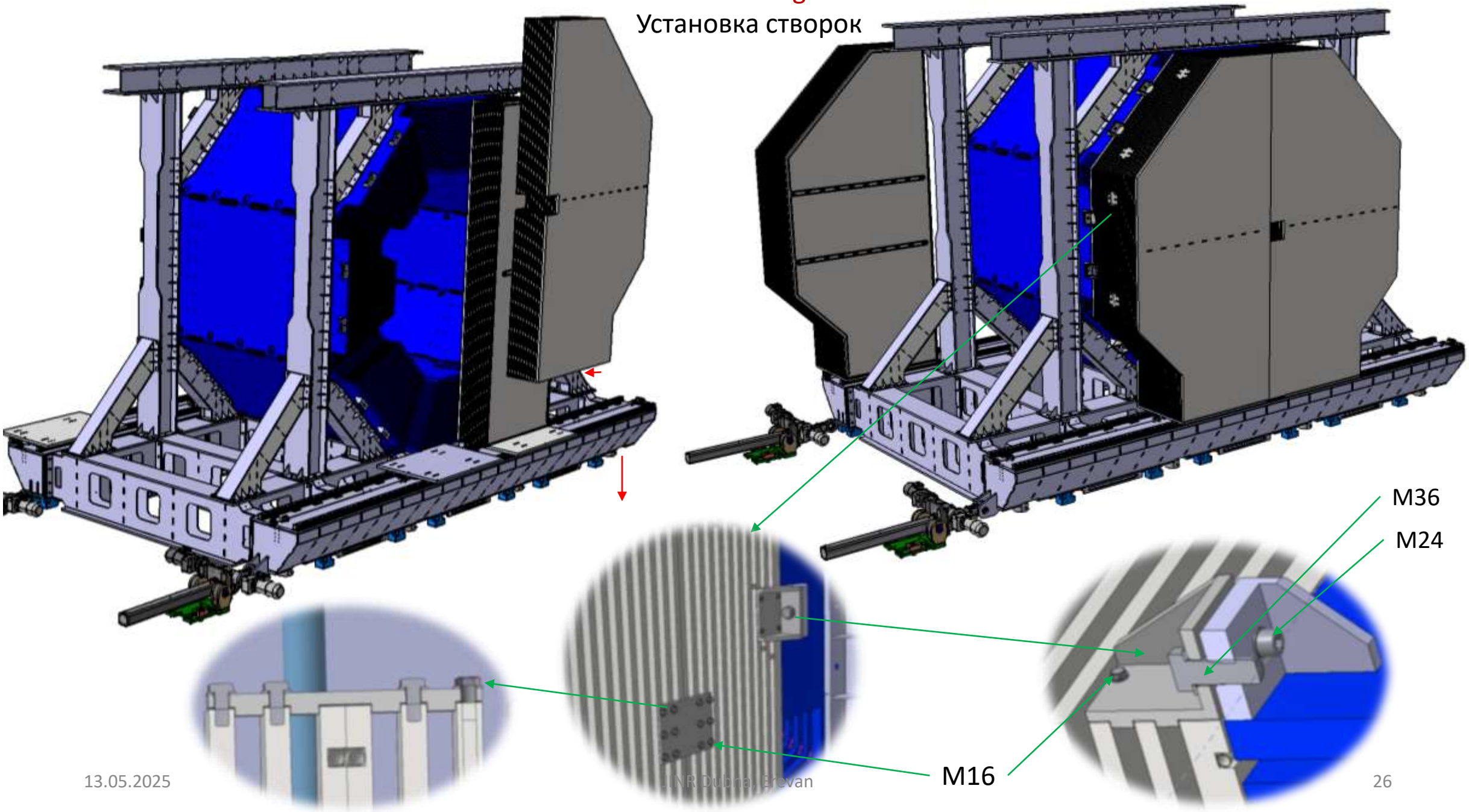
Установка системы перемещения створок





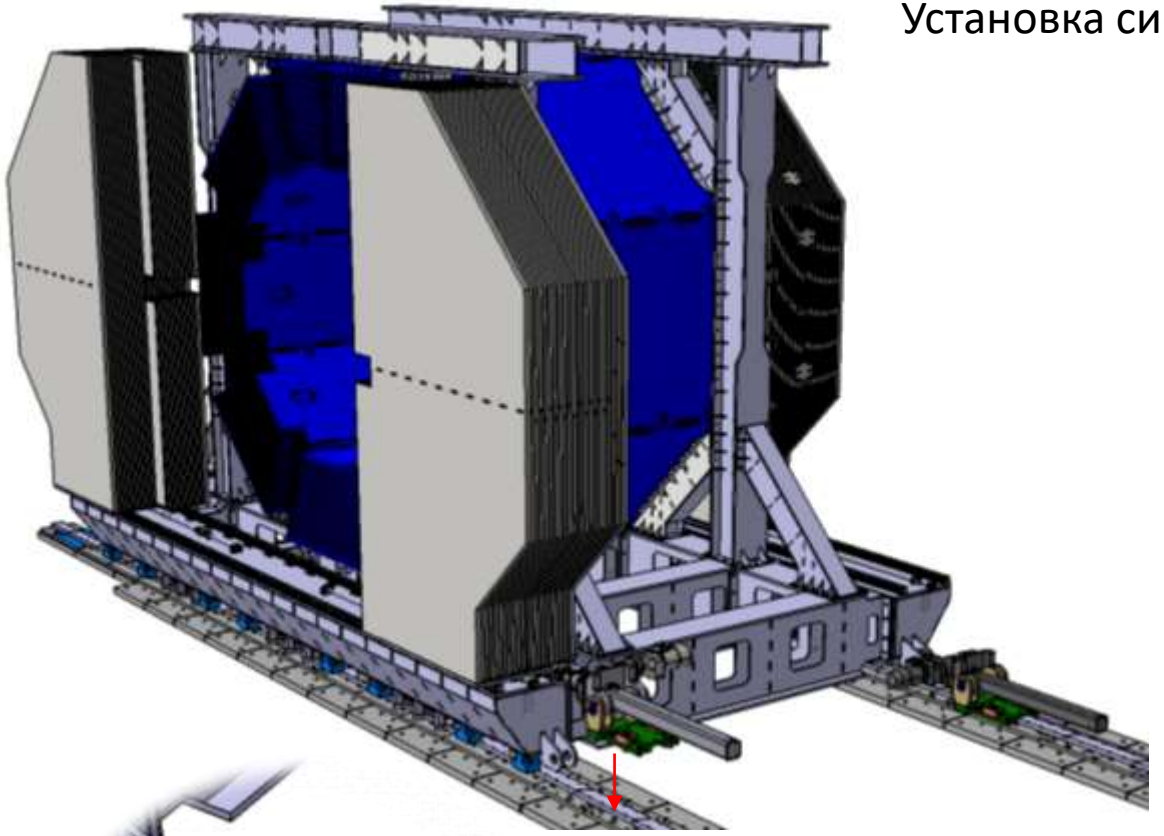
Fold mounting

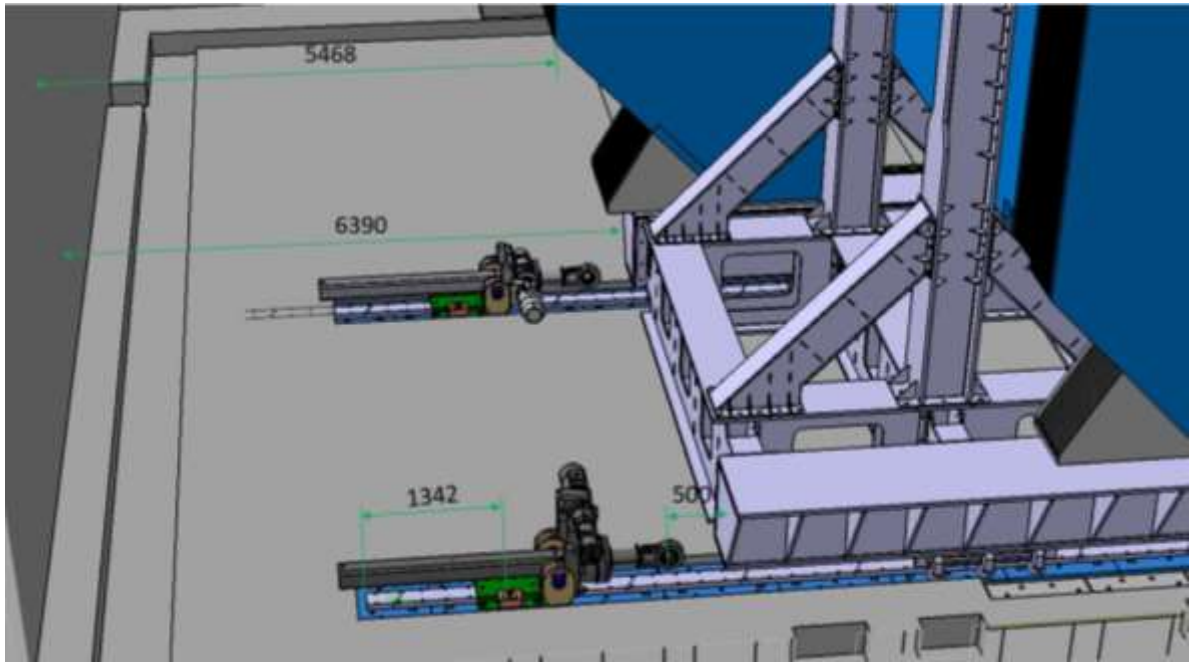
Установка створок

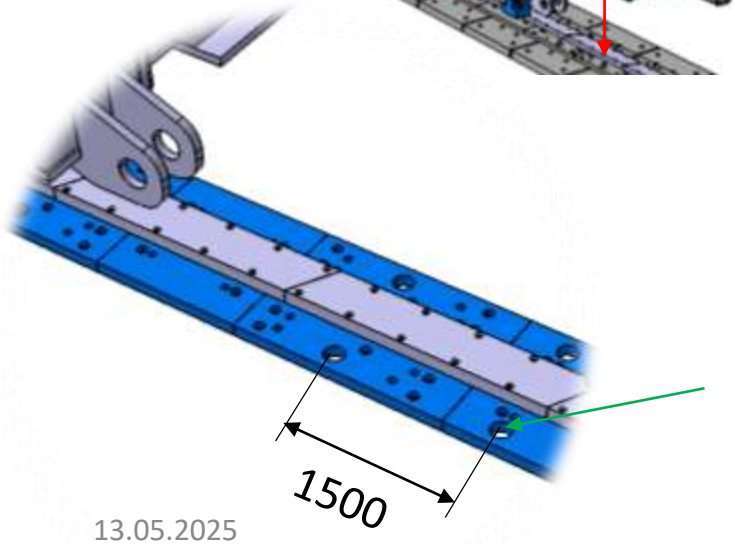


Movement system installation

Установка системы перемещения



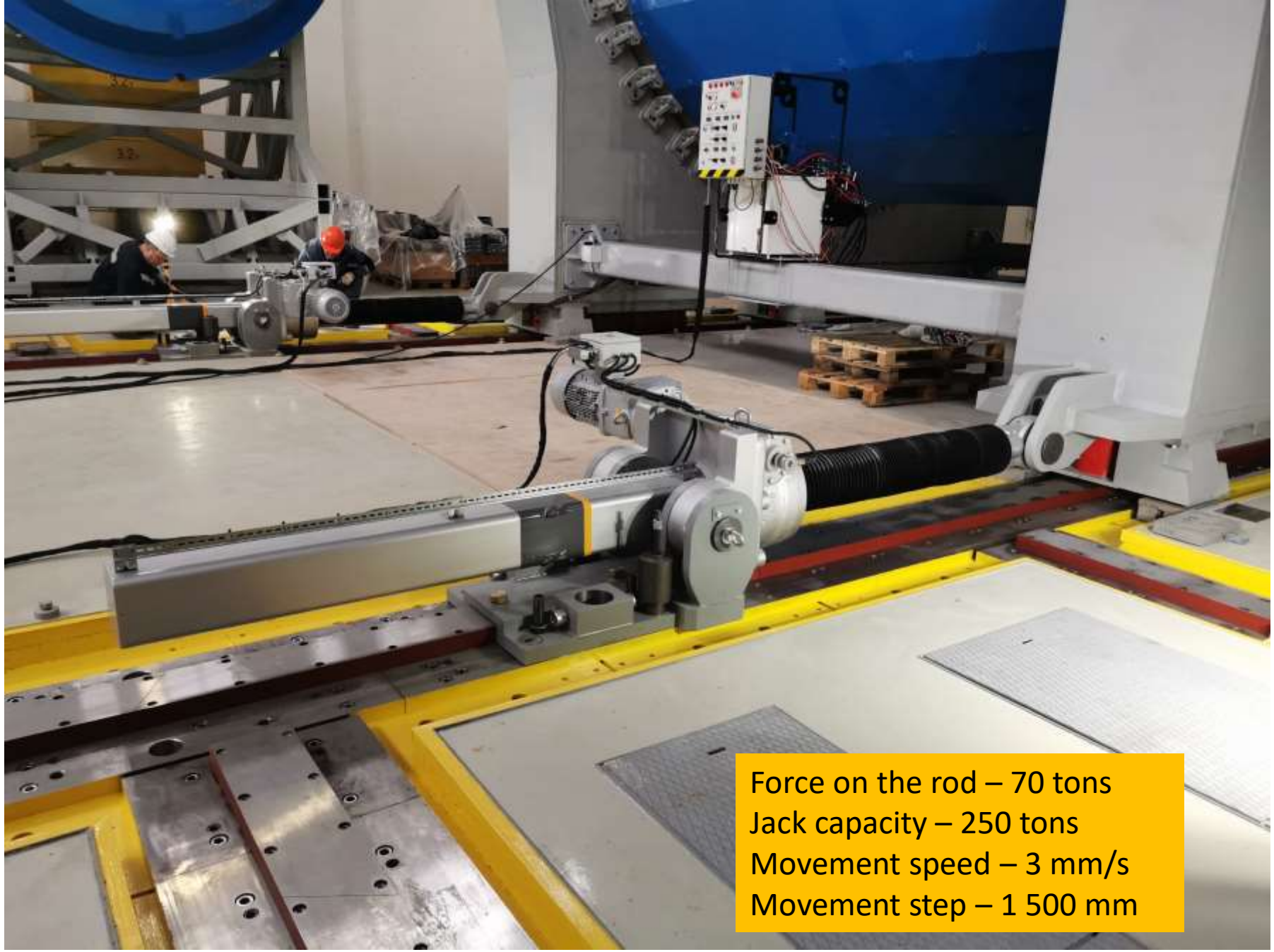




Hole Ø80H8
for pin Ø80h7

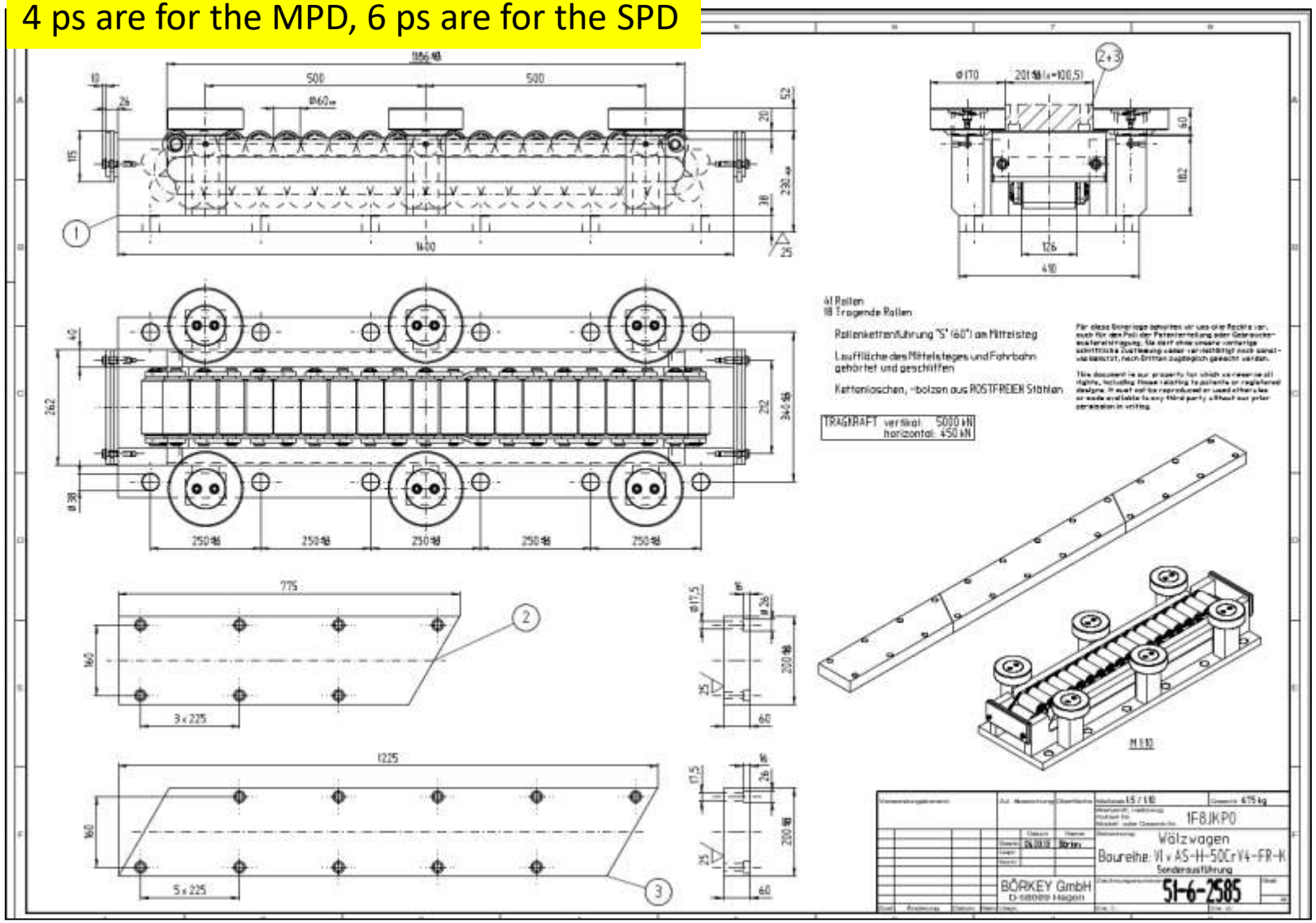
Positive experience: MPD movement system

It can be the same or similar for SPD


Force on the rod – 70 tons
Jack capacity – 250 tons
Movement speed – 3 mm/s
Movement step – 1 500 mm

Borkey Roller Scate

500 tons capacity of 1 pc
4 ps are for the MPD, 6 ps are for the SPD



Thanks you for your attention