



In safe hands.

LANDING GEAR ROBOT



27.09.2019

- 1** Unique selling propositions
- 2** Working space
- 3** Human-machine interface (HMI)
- 4** Technical Data

PURE INNOVATION

DESIGN



In safe hands.



PURE INNOVATION

DESIGN



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PURE INNOVATION

DESIGN



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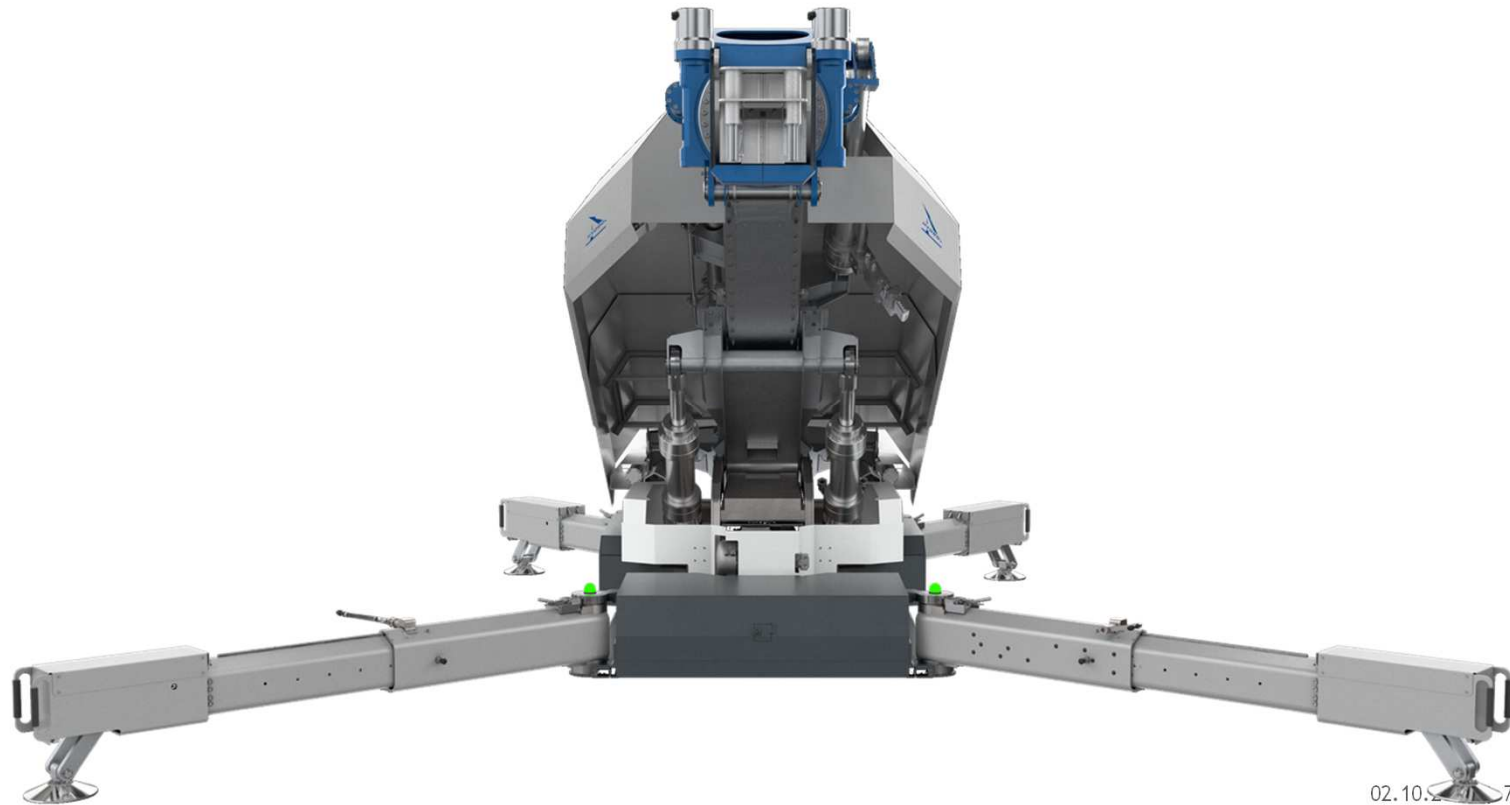


PURE INNOVATION

DESIGN



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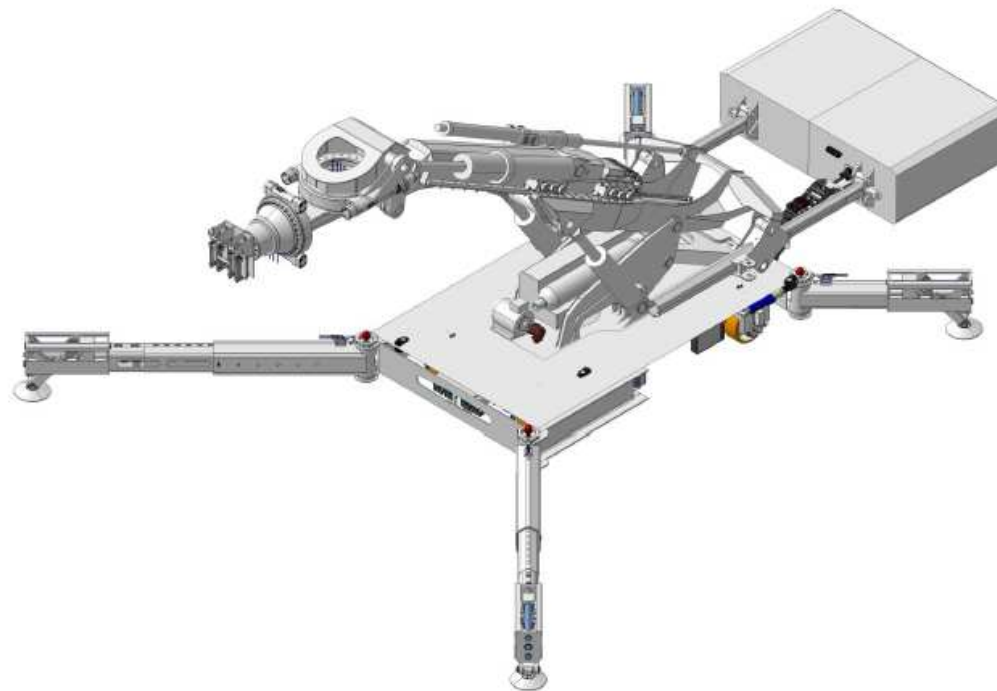


02.10.2017

PURE INNOVATION
UNDER COVER



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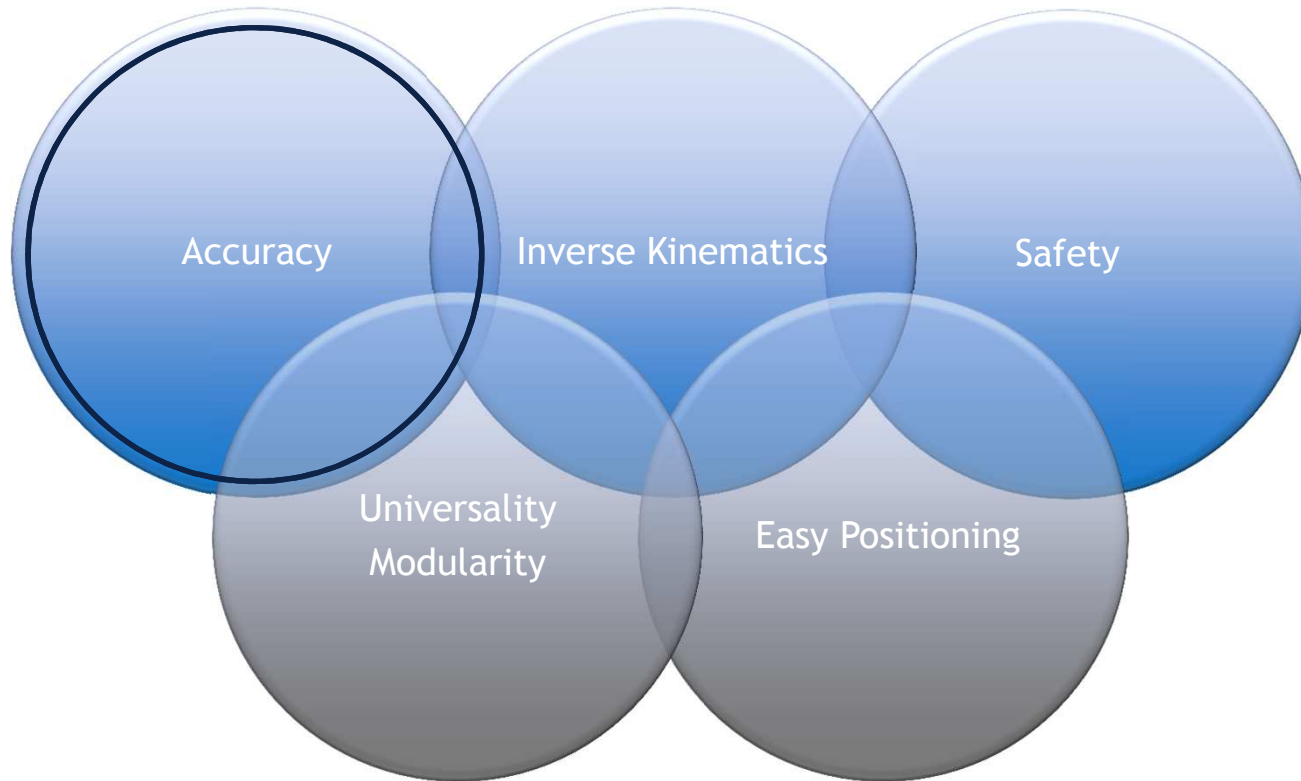
UNIQUE SELLING PROPOSITIONS

UNIQUE SELLING PROPOSITIONS

OVERVIEW



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UNIQUE SELLING PROPOSITIONS

ACCURACY



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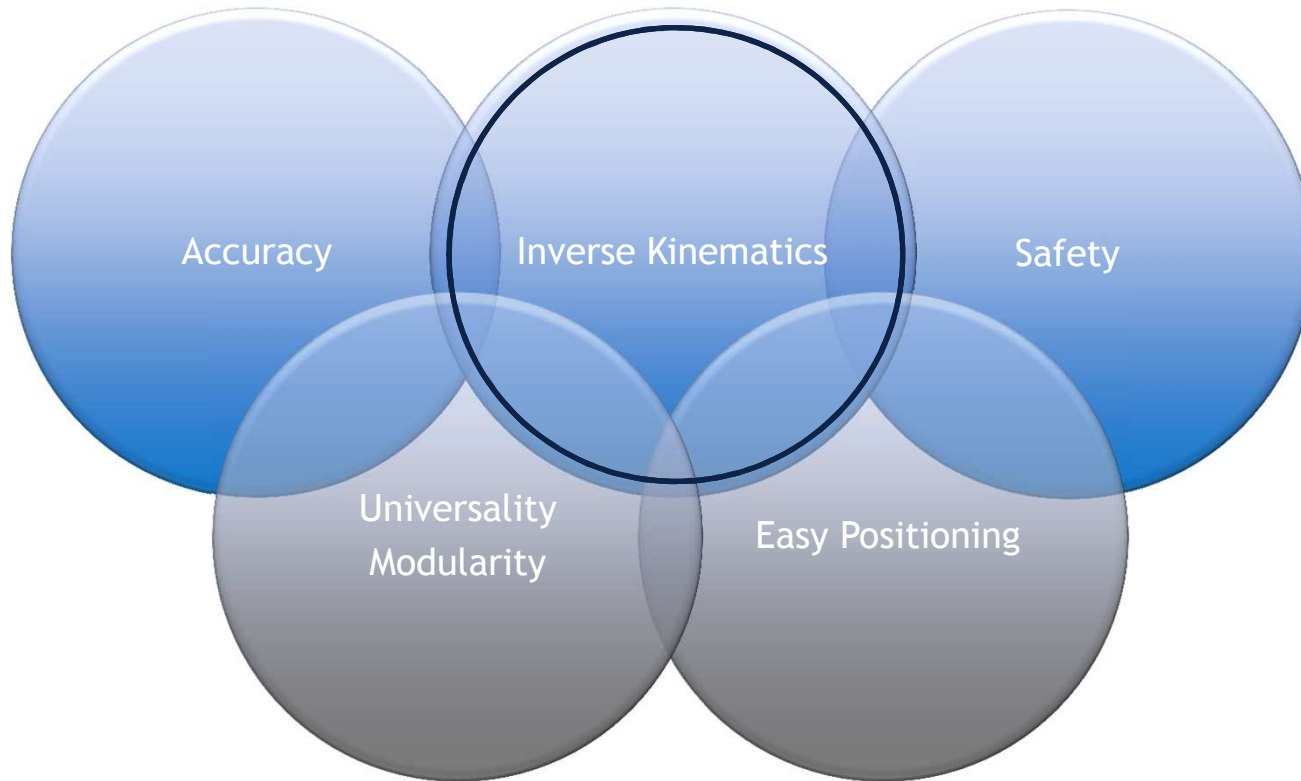
Accuracy/fineness of $\pm 0,1$ mm ($\pm 0,0039$ in) at the cardan shaft fixture can be achieved

UNIQUE SELLING PROPOSITIONS

OVERVIEW



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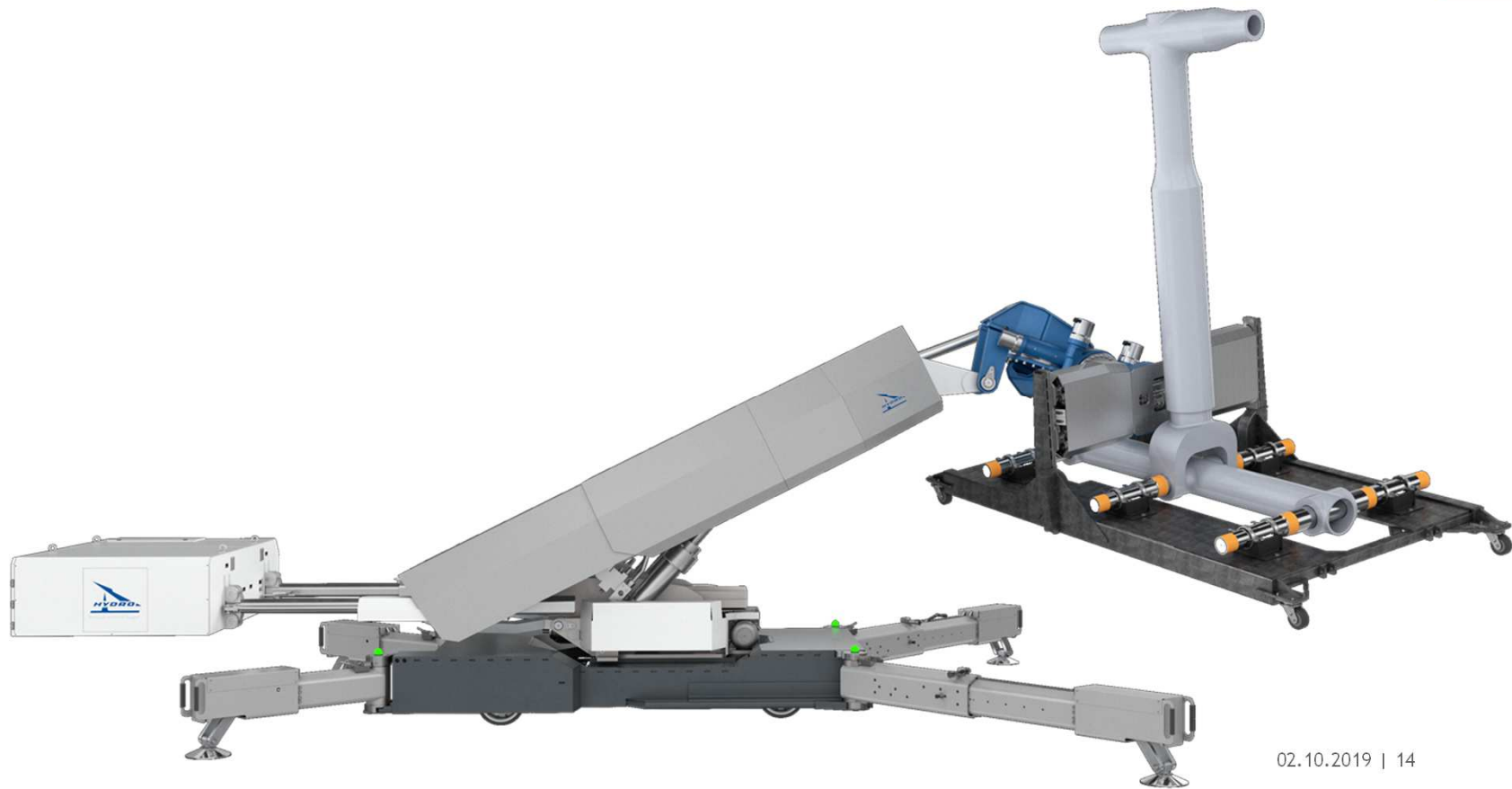
The Landing Gear Robot comes with Inverse Kinematics

- The integrated computer system transfers all operator commanded movements to optimized, synchronized movements of the hydraulic actuators
 - Our Landing Gear Robot comes with 6 degrees of freedom (DOFs) = six axes
 - The operator can rotate the a/c nose landing gear around its centre point axis = rotation around a virtual yaw axis.
 - The operator stands on the working platform close to the NLG fixture point and commands the Landing Gear Robot with the remote control.
- Significant reduction of handling complexity

DESIGN



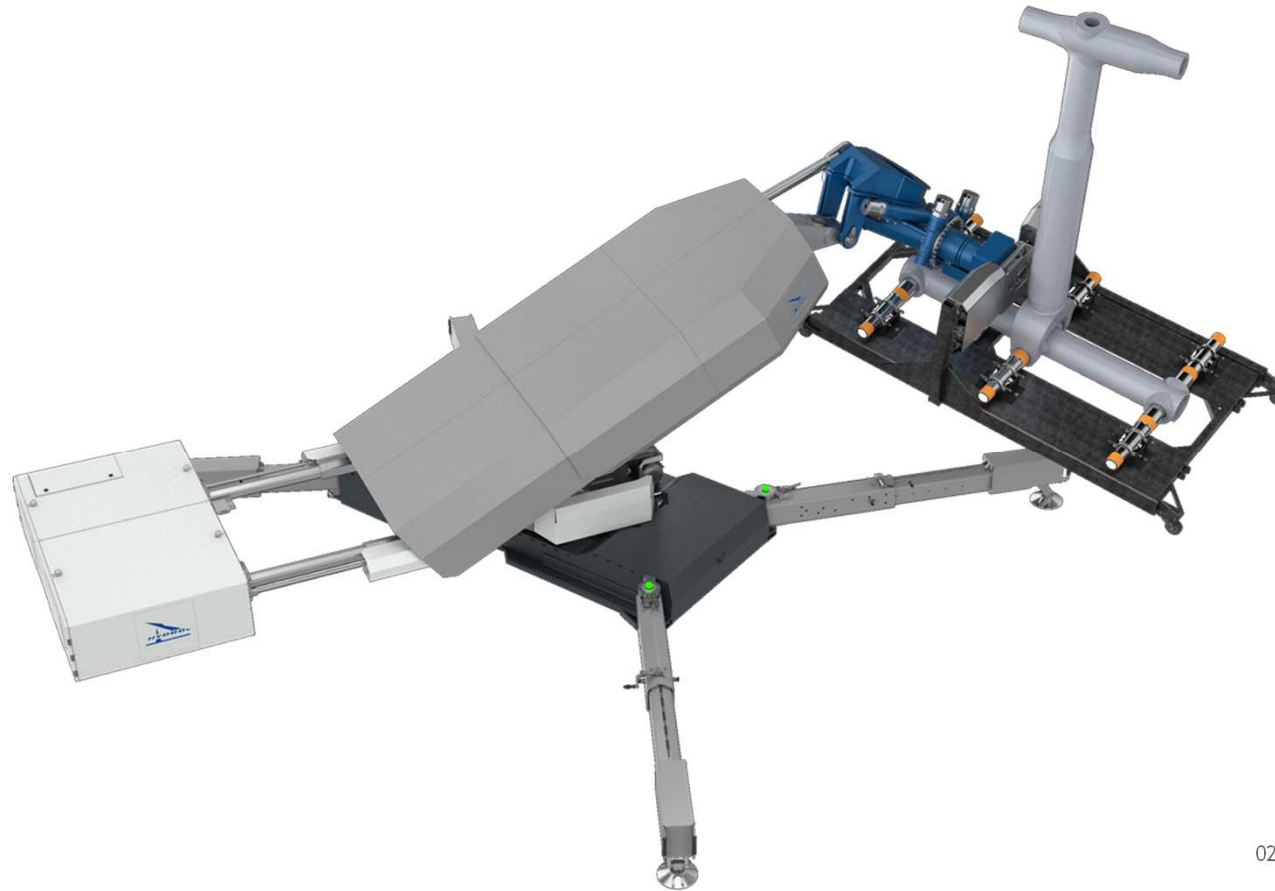
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DESIGN



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DESIGN



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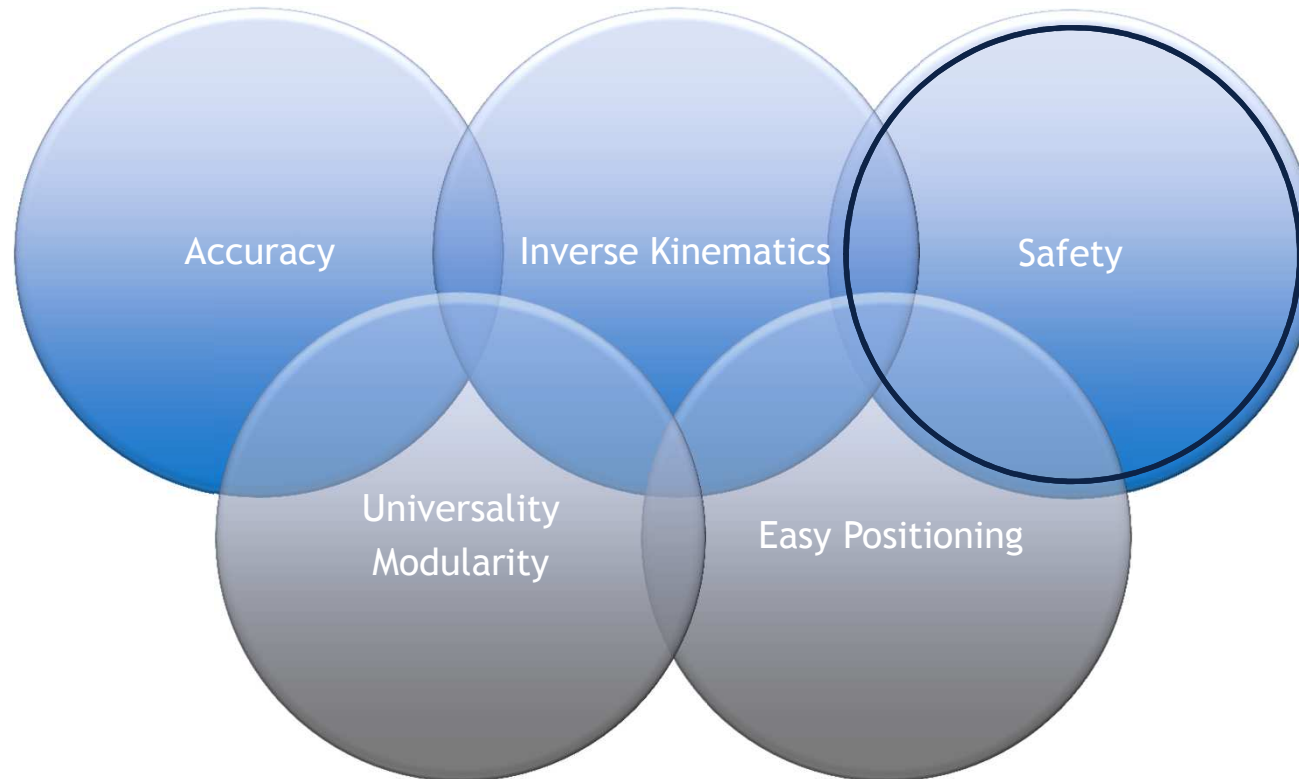


UNIQUE SELLING PROPOSITIONS

OVERVIEW



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Split / Separated work process

Installation

- The landing gear can be lifted “quickly” - 30 to 50 mm (1.2 to 2 in) per second
- Subsequent installation movements are driven sensitively slowly - 0,5 mm (0,02 in) per second

Removal

- Landing gear unpinning is executed sensitively slowly - 0,5 mm (0,02 in) per second
- High process safety level

Safety lock

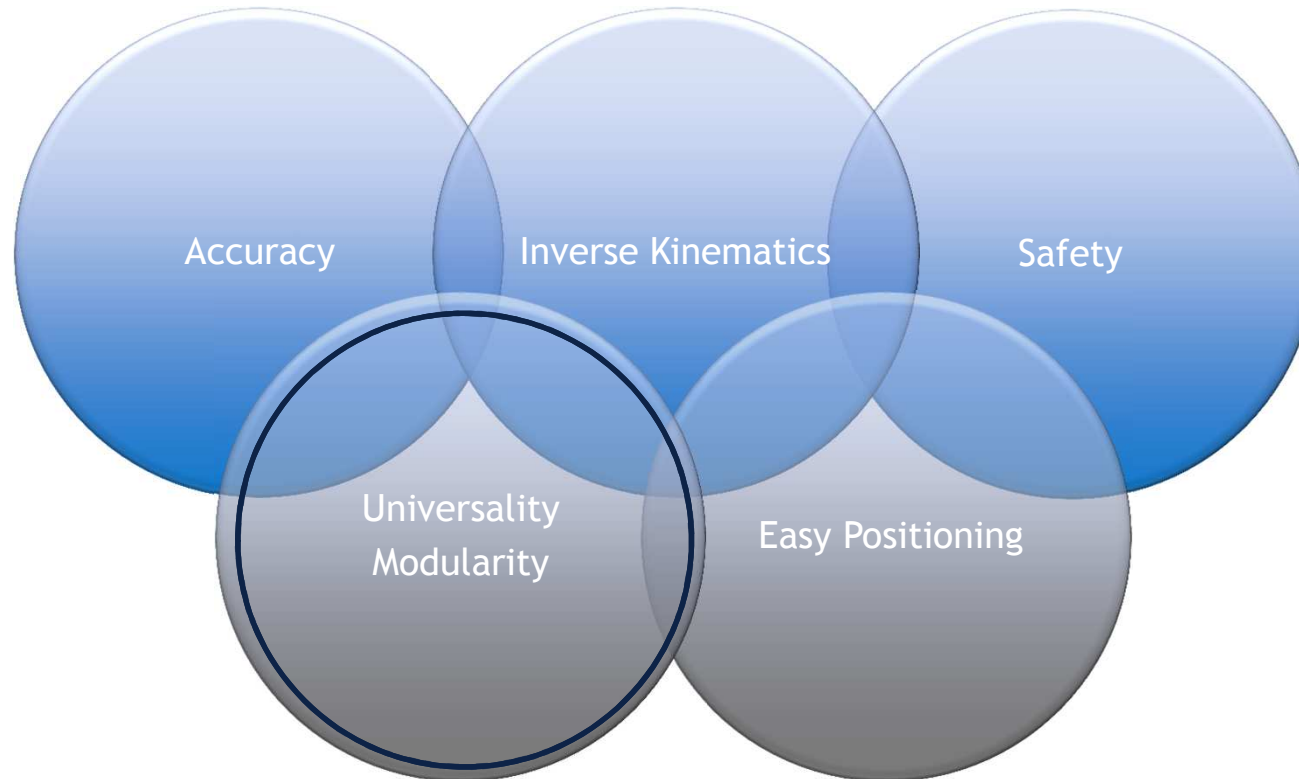
In the event of hydraulic pressure loss all hydraulic actuators will be blocked

UNIQUE SELLING PROPOSITIONS

OVERVIEW



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UNIQUE SELLING PROPOSITIONS

UNIVERSALITY + MODULARITY



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Modular LGR design enables unrivalled universality.

- Able to change all landing gears of a wide range of aircraft (E170 to A380) - “one for all”
 - Hook up various attachments to the cardan shaft plate, which is equipped with electric and hydraulic coupling interfaces
- The Landing Gear Robot is suited to a wide variety of installation applications

Landing gear loading onto a transport trolley.

- The trolley (LG-Rack) is used as a rigging rack
- Following today's process
- The trolley comes with an interface for locking the universal adapter interface to the cardan shaft
- Cost optimization by using one adapter for all racks

UNIQUE SELLING PROPOSITIONS

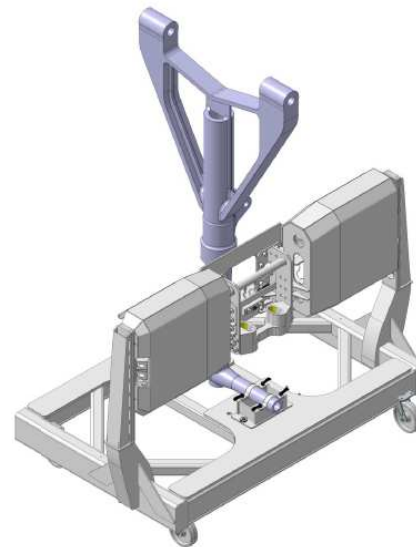
LANDING GEAR RACKS



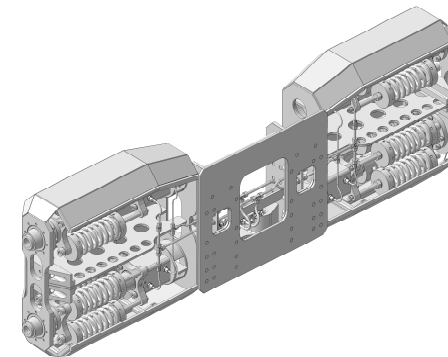
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MLG-, WLG-, CLG-, BLG-Rack



NLG-Rack



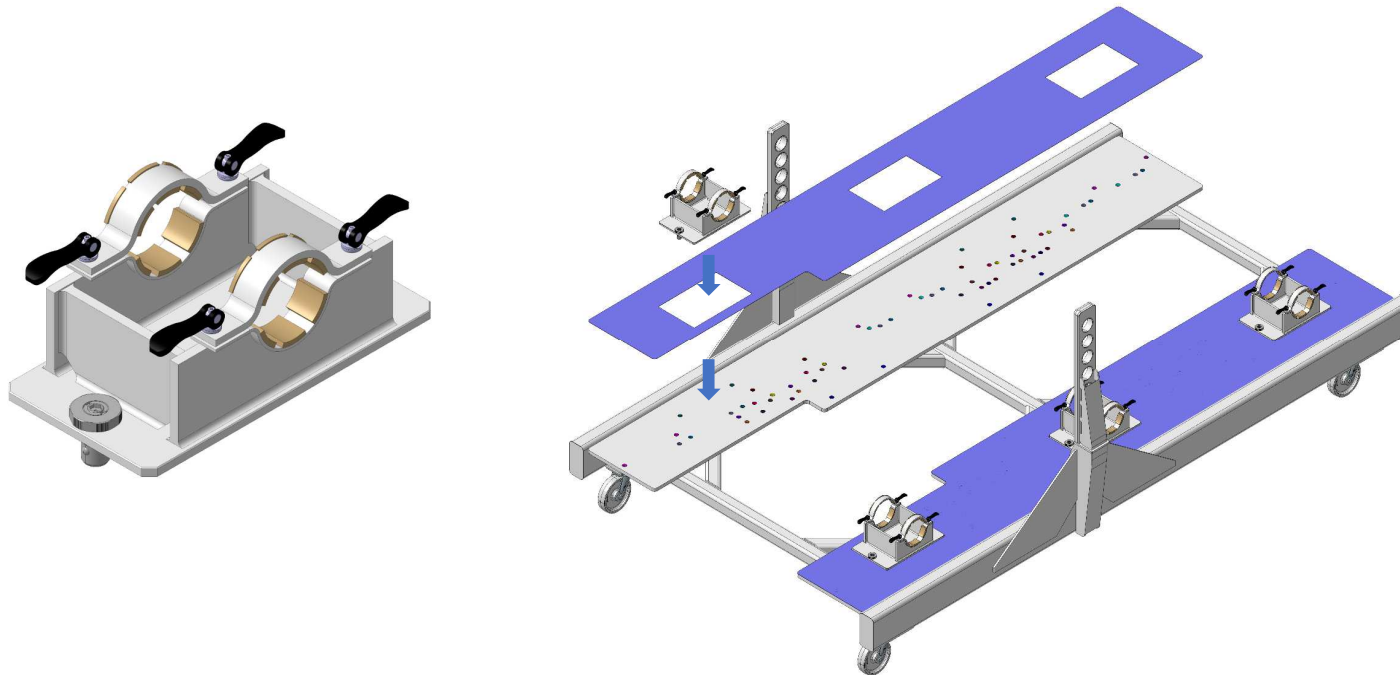
Universal-Adapter

UNIQUE SELLING PROPOSITIONS

LANDING GEAR LOADING



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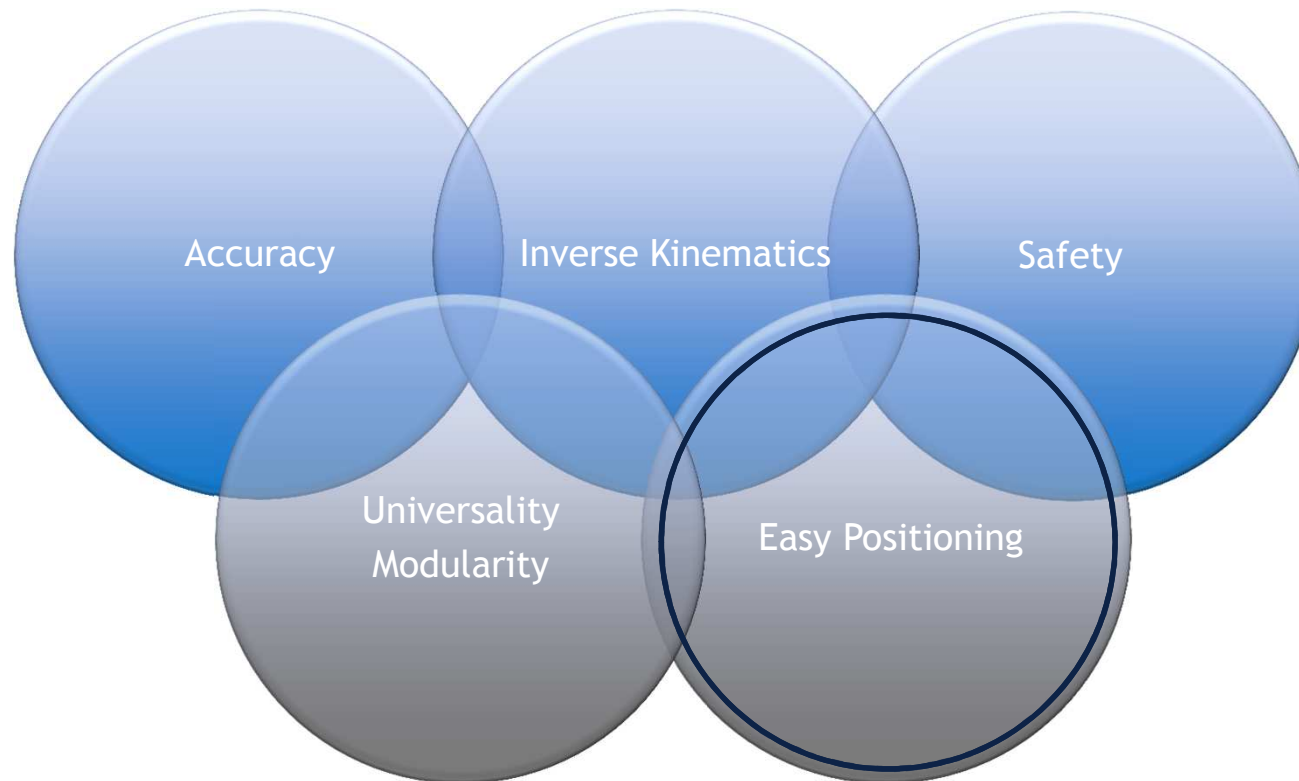
“magic carpets” for identification of a/c specific clamp position

UNIQUE SELLING PROPOSITIONS

OVERVIEW



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Precision positioning once for the entire installation procedure

The huge working space enables the compensation of inadequate positioning

Drive small and stand tall.

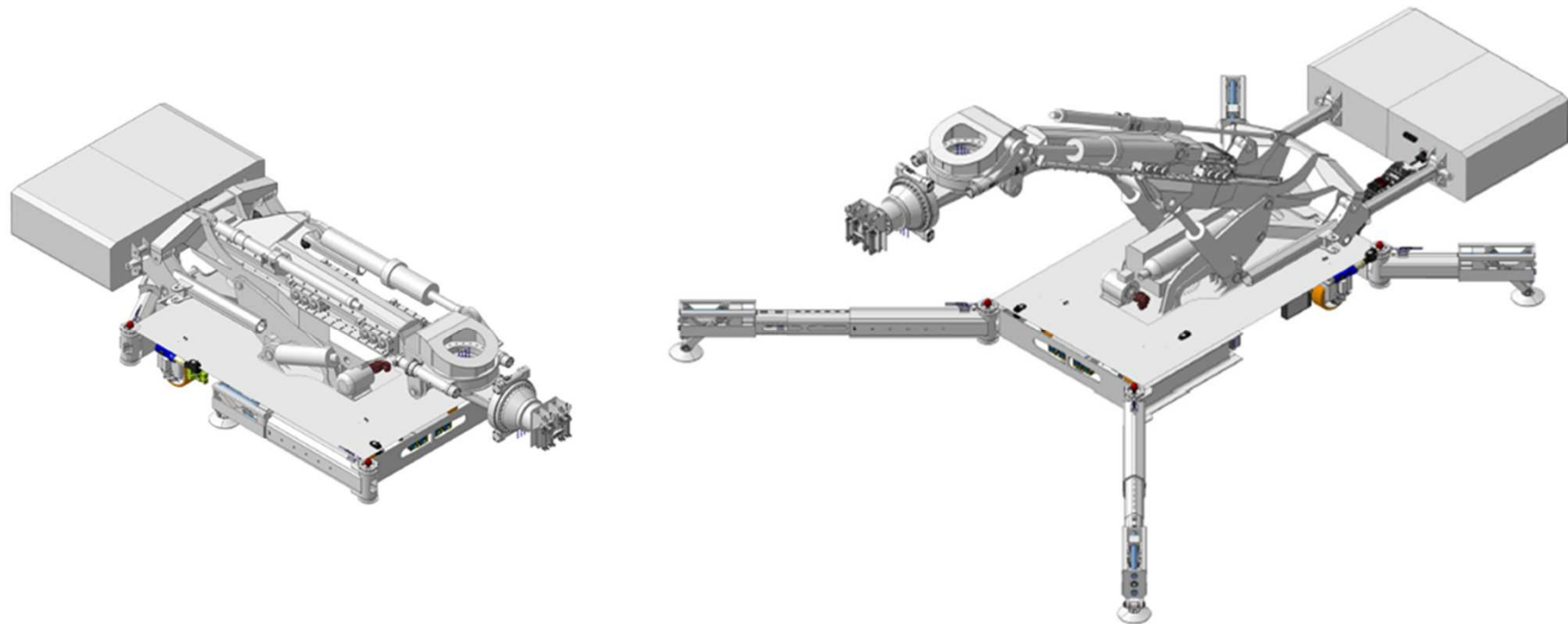
- For positioning under the aircraft the Landing Gear Robot pushes or pulls the Landing Gear Rack
 - Reaching the lifting position the four hydraulic support struts are expanded manually and its ground plates are lowered electrically
 - The Landing Gear Robot's platform then levels automatically
- Small dimension in driving mode
- Huge standing footprint with expanded support struts ensures greatest safety against overturning

UNIQUE SELLING PROPOSITIONS

EASY POSITIONING



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UNIQUE SELLING PROPOSITION

EASY POSITIONING

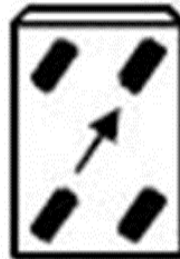
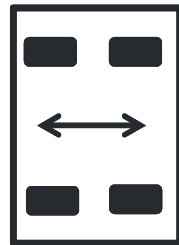


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Outstanding manoeuvrability of driving platform

- The four driven, 180° steerable wheels, enable sideward-, crab-driving and rotation around the platform centre point axis

Driving Modes



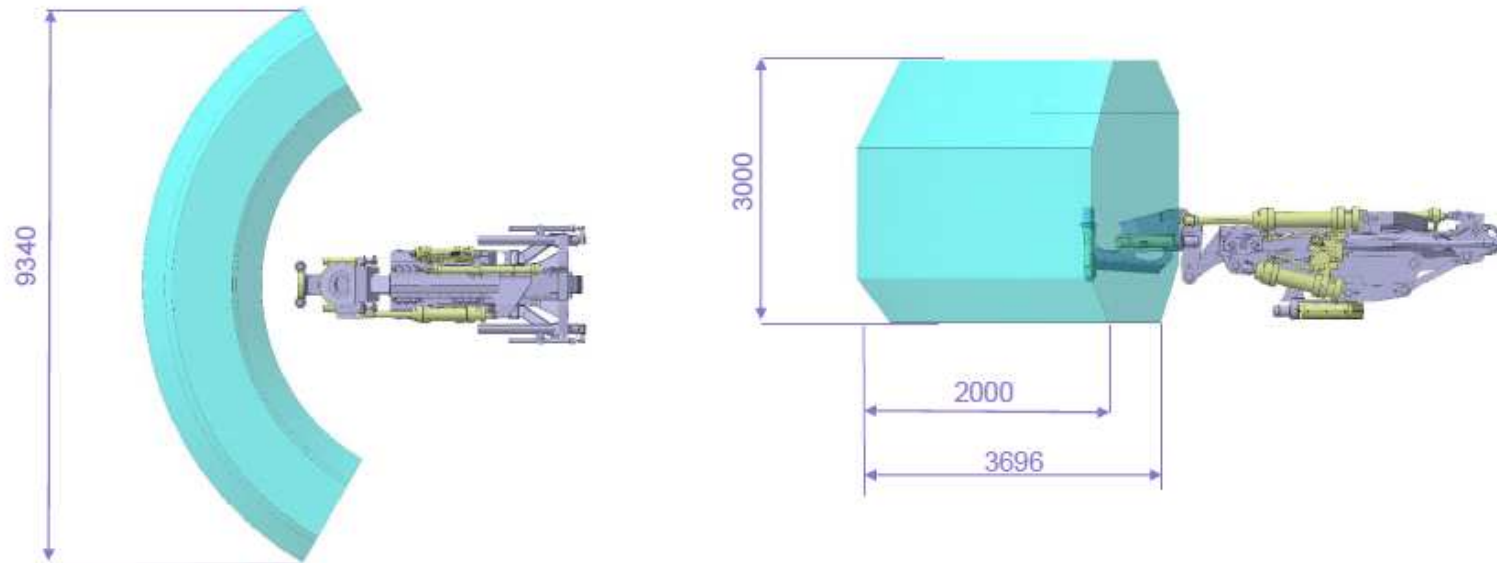
WORKING SPACE

WORKING SPACE

WORKING SPACE - INITIAL SPECIFICATION



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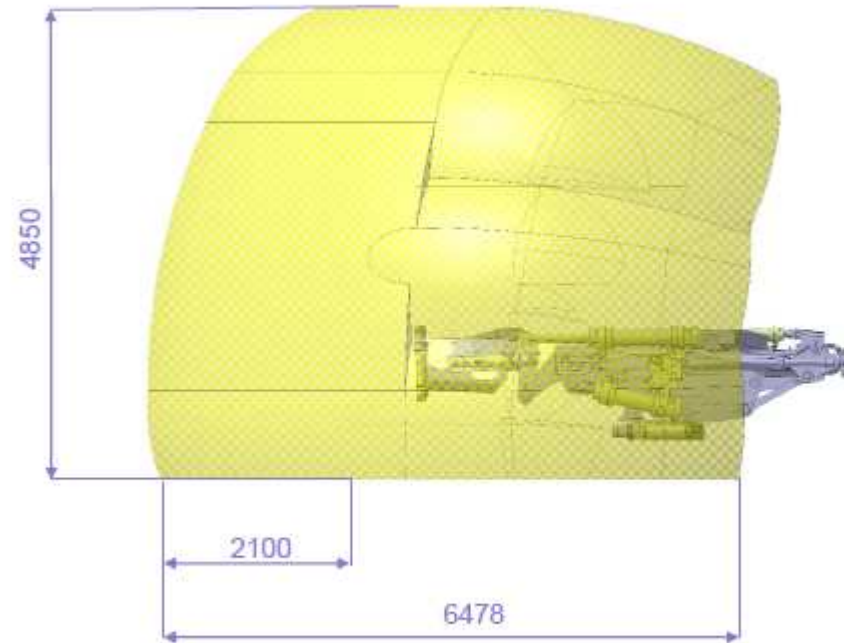
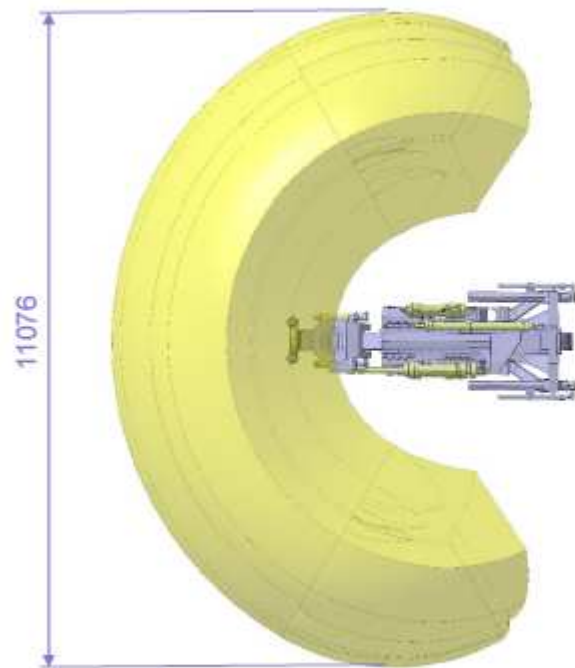


WORKING SPACE

WORKING SPACE - ACTUAL



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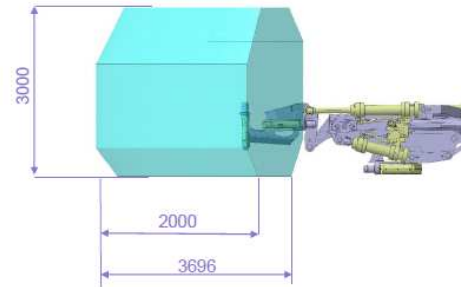
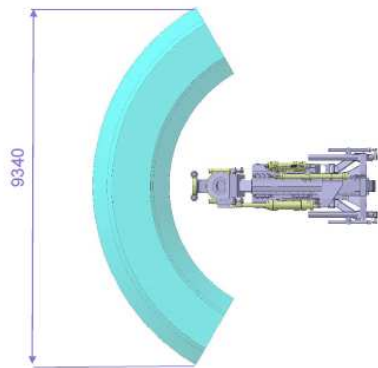
WORKING SPACE

WORKING SPACE - SPECIFIED VERSUS ACTUAL

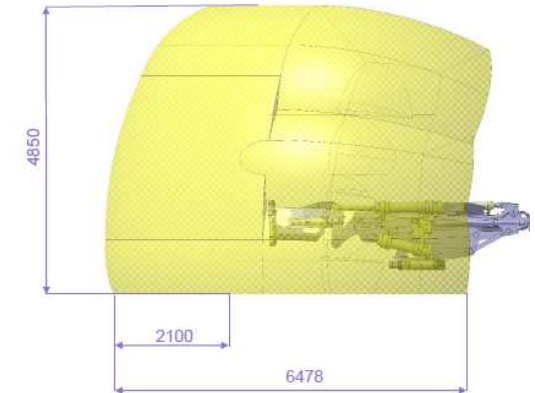
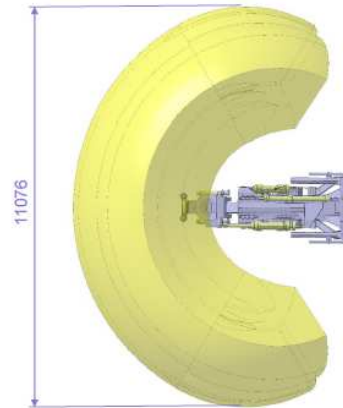


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Specified



Actual



HUMAN-MACHINE INTERFACE (HMI)

RADIO REMOTE CONTROL

HBC RADIOMATIC



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PRODUCT DATA

PRODUCT DATA

LANDING GEAR ROBOT



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Characteristic	Specification
Dimensions (l x w x h) - driving condition	7122 mm x 2300 mm x 1590 mm (280 in x 91 in x 63 in)
Weight	11,500 t (12,67 tn.sh.)
Temperature range	-20° C to +50° C (-4° F to +122° F)
Load capacity (whole working space)	6,5 t (7,17 tn.sh.)
Number of degrees of freedom (DOFs)	6
Minimum height	673 mm (26,5 in)
Maximum height	3865 mm (152,2 in)
Drive	4 x electric drives
Steering / maximum steering angle	Four-wheel steering / maximal 90°
Max. charging time (100 % DOD)	3 hours
Battery capacity: Number of LG changes	Min. 2 x A380 MLG
Electrical power supply	22 KW three-phase current

CHARACTERISTICS

LANDING GEAR RACKS



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Characteristic	Specification
NLG-Rack - dim. (l x w x h)	1340 mm x 2450 mm x 1585 mm (52,8 in x 96,5 in x 62,4 in)
MLG-; WLG-,CLG-, BLG-Rack-dim. (l x w x h)	3904 mm x 2450 mm x 1617 mm (153,7 in x 96,5 in x 63,7 in)
NLG-, B737-MLG-Rack - weight	635 kg (1400 lbs)
MLG-; WLG-,CLG-, BLG-Rack - weight	1513 kg (3336 in)
Number of rack models	1 x for NLG, 1 x for MLG, WLG, CLG, BLG
Universal adapter - dim. (l x w x h)	2180 mm x 355 mm x 696 mm (85,8 in x 13,97 x 27,4 in)
Universal adapter - weight	550 kg (1212 lbs)



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THANK YOU FOR YOUR INTEREST !





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