

Heavy Wall Chock Handling Machinery – Human Factors

- Trevor Mole
- Ross Stutchbury
- Nathan Hohnberg



Outline

IME Heavy Wall Chock Handling Machines

- Chock Carrier Camera assisted visibility
- Dozer conceptual development with focus on access, cabin and controls
- Dozer Human Machine Model
- Technology facilitated advances for machinery human factor design

Heavy Wall Chock Handling Machinery

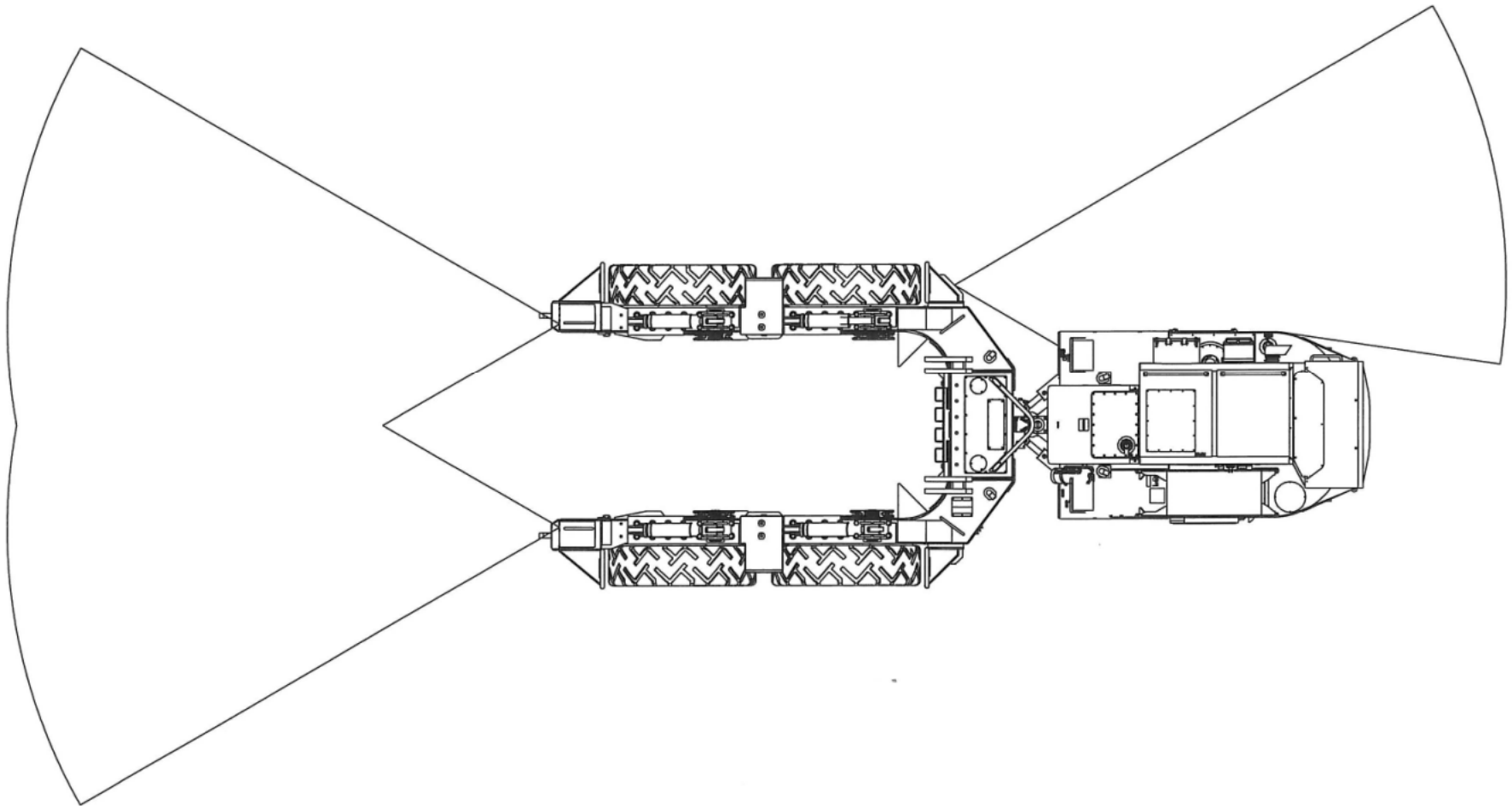


CHOCK CARRIER





- Operators Cabin



- Chock Carrier Camera scope



- ODS Camera

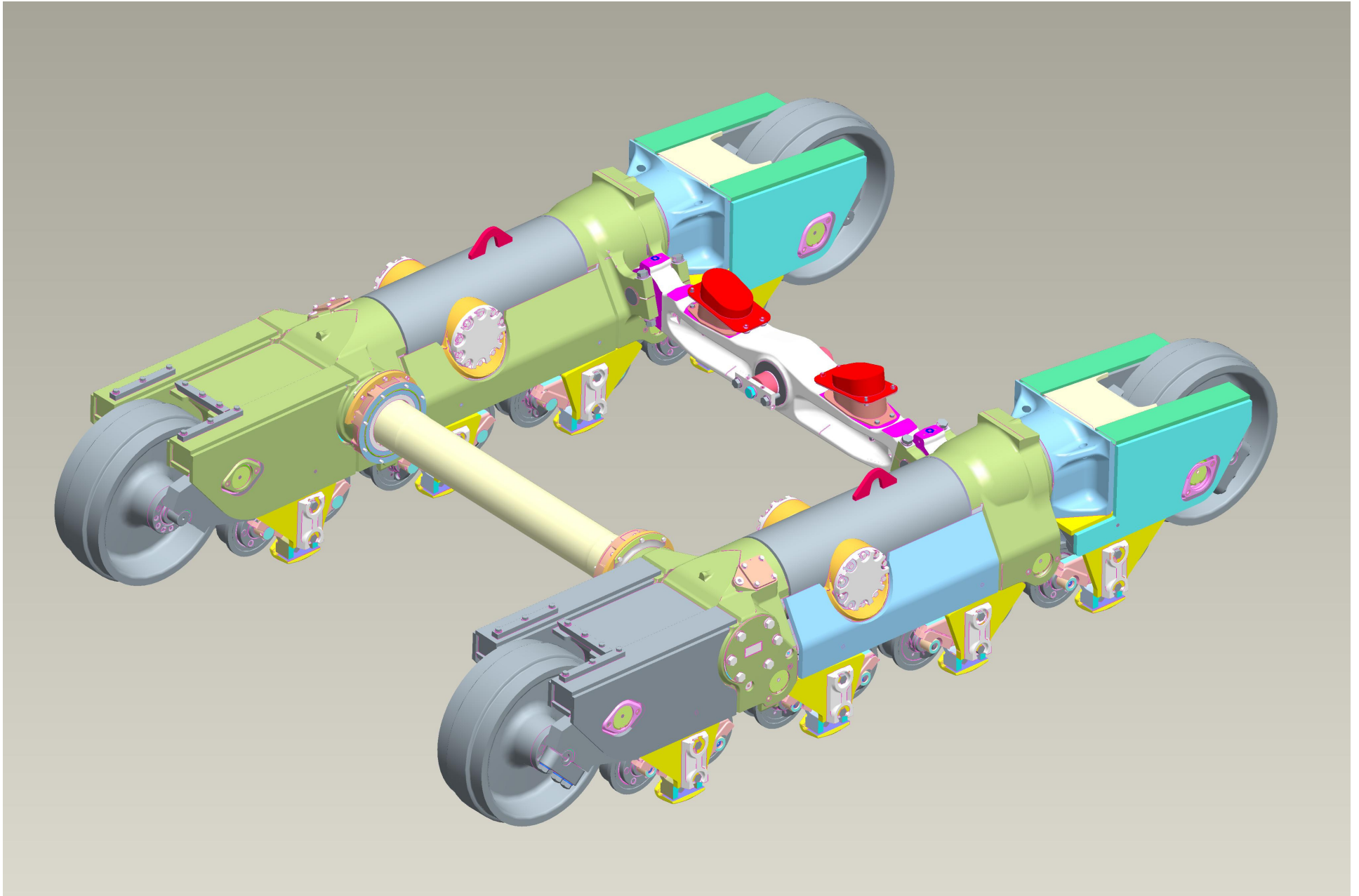


- Rear facing cameras

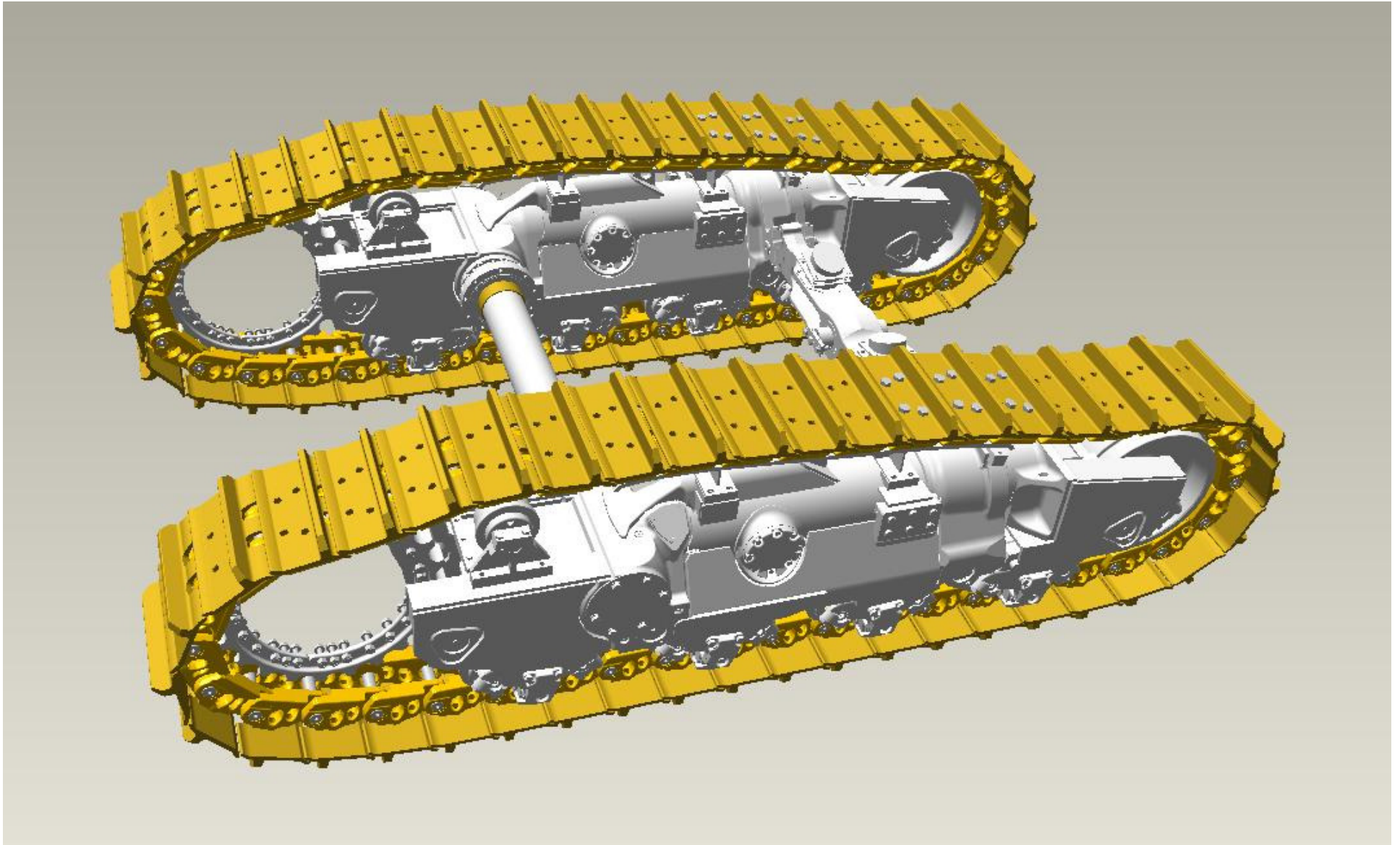
DOZER



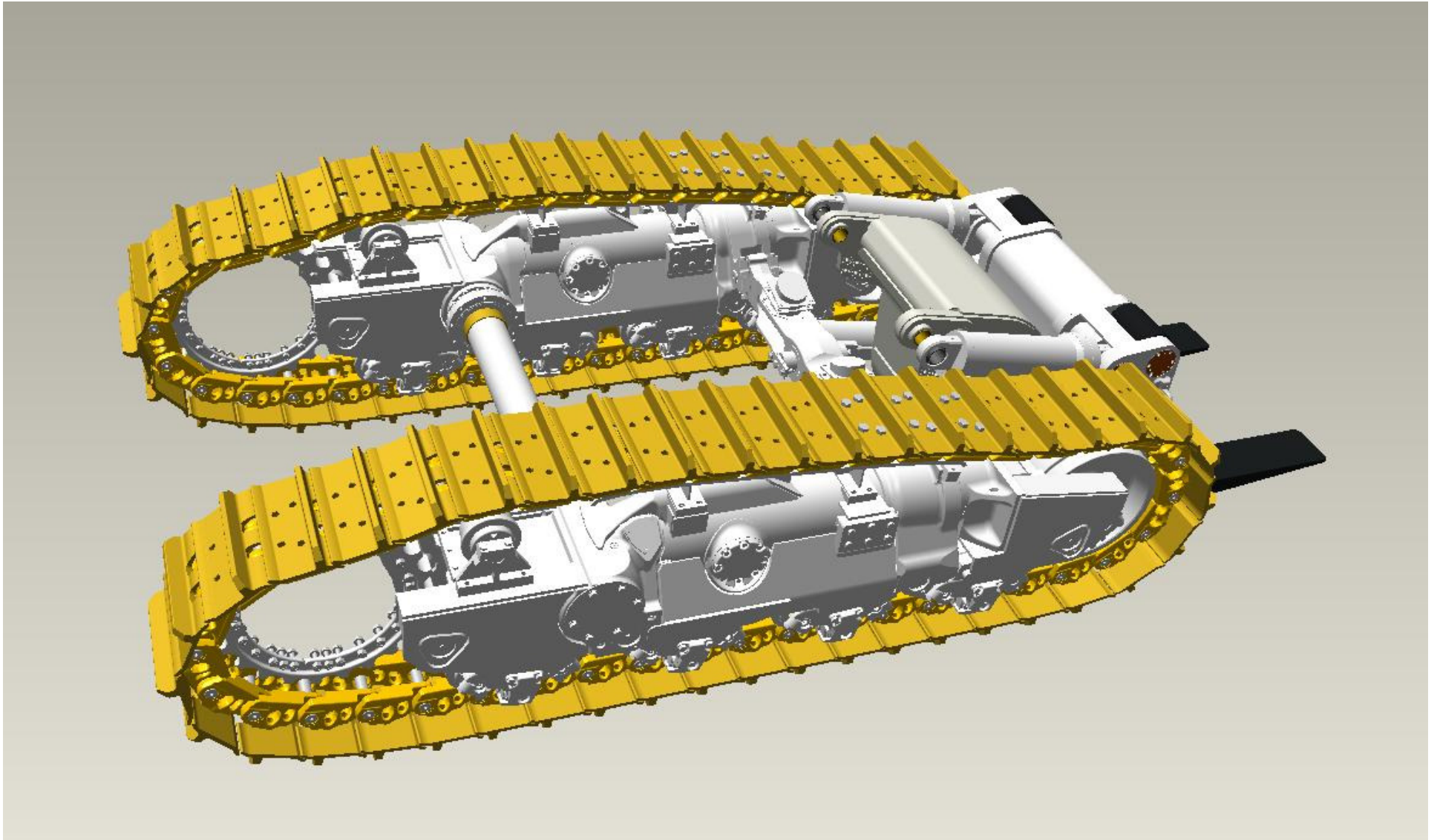




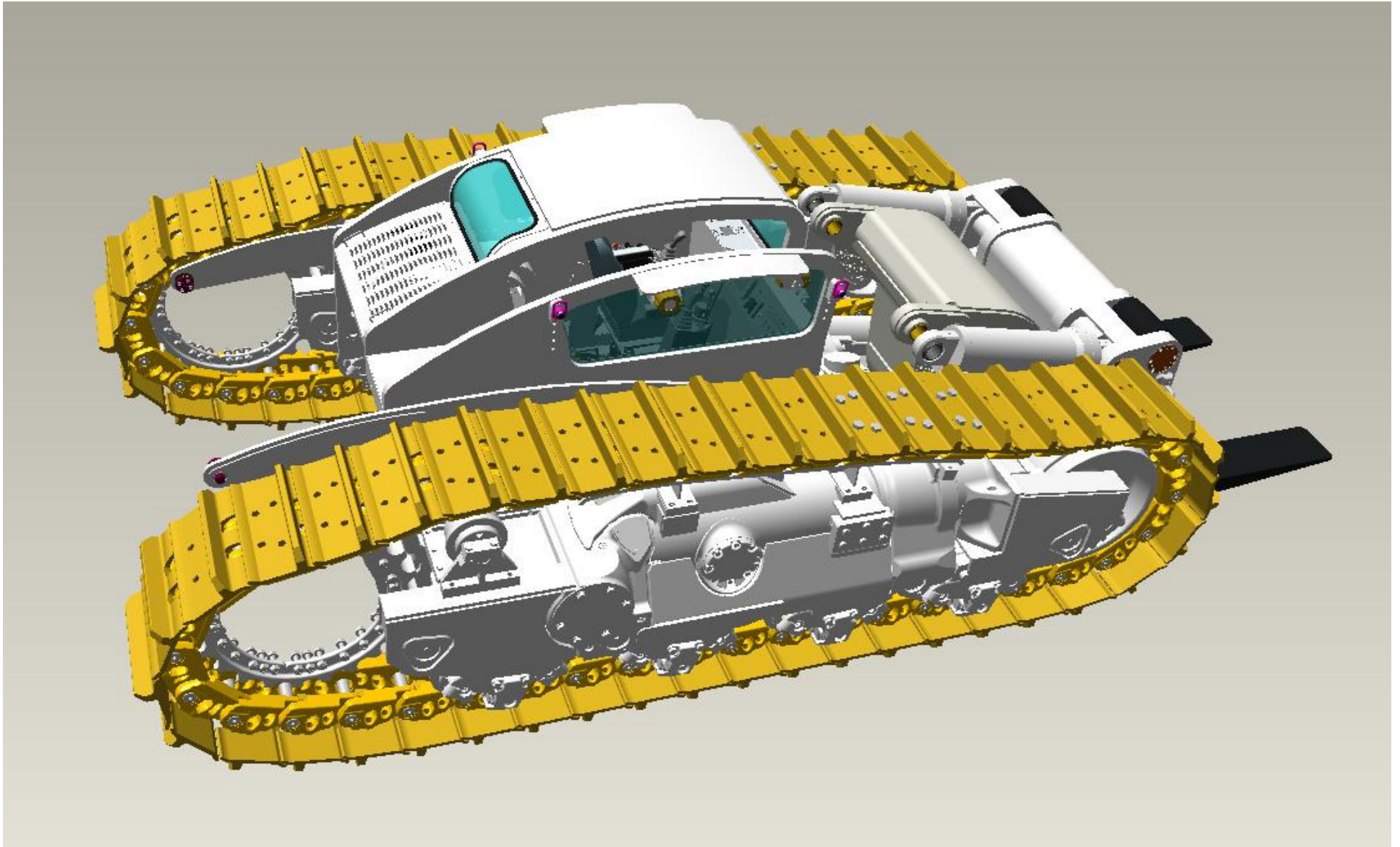
- Caterpillar D11 Undercarriage



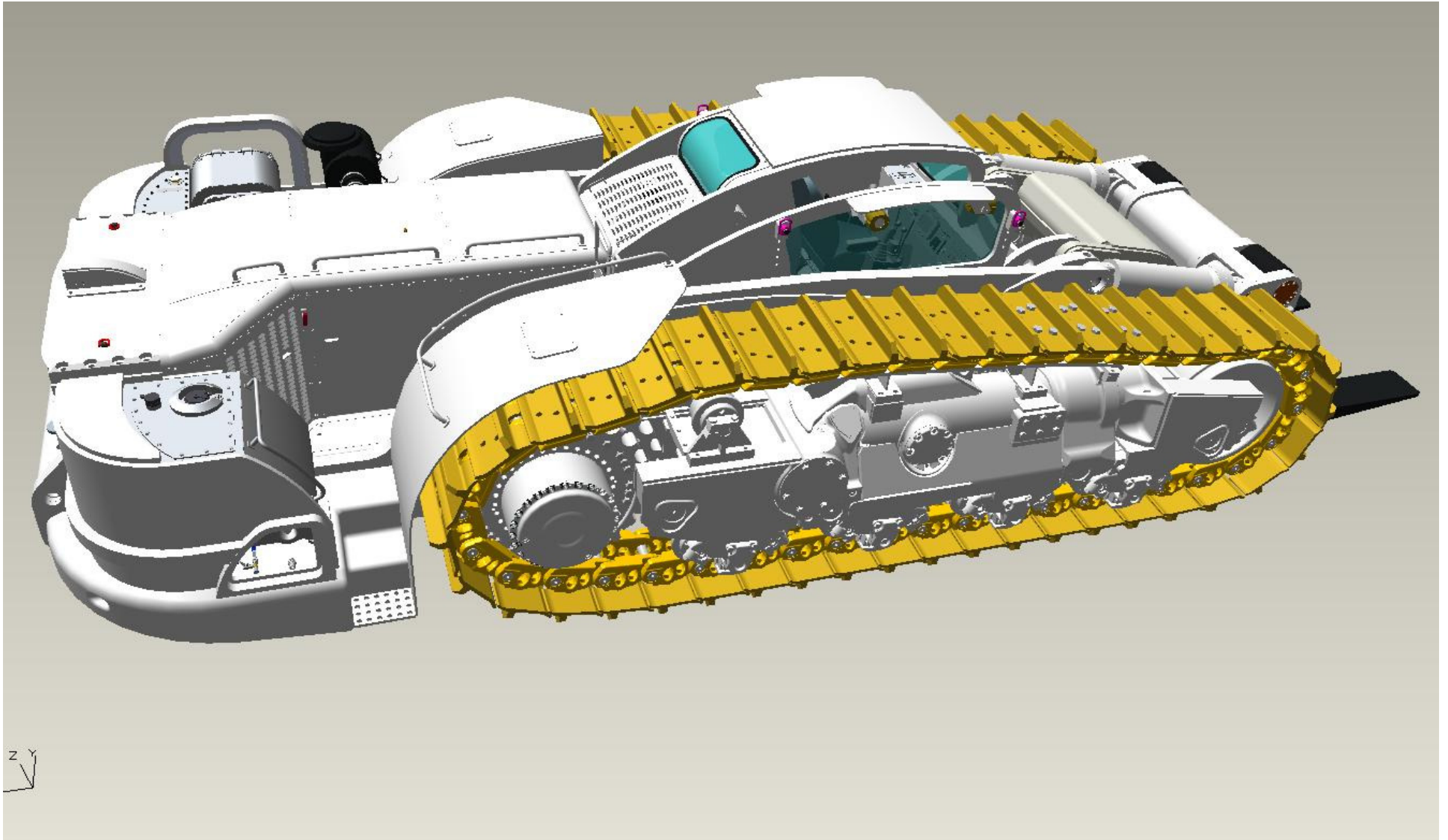
- Modified D11 Caterpillar Undercarriage



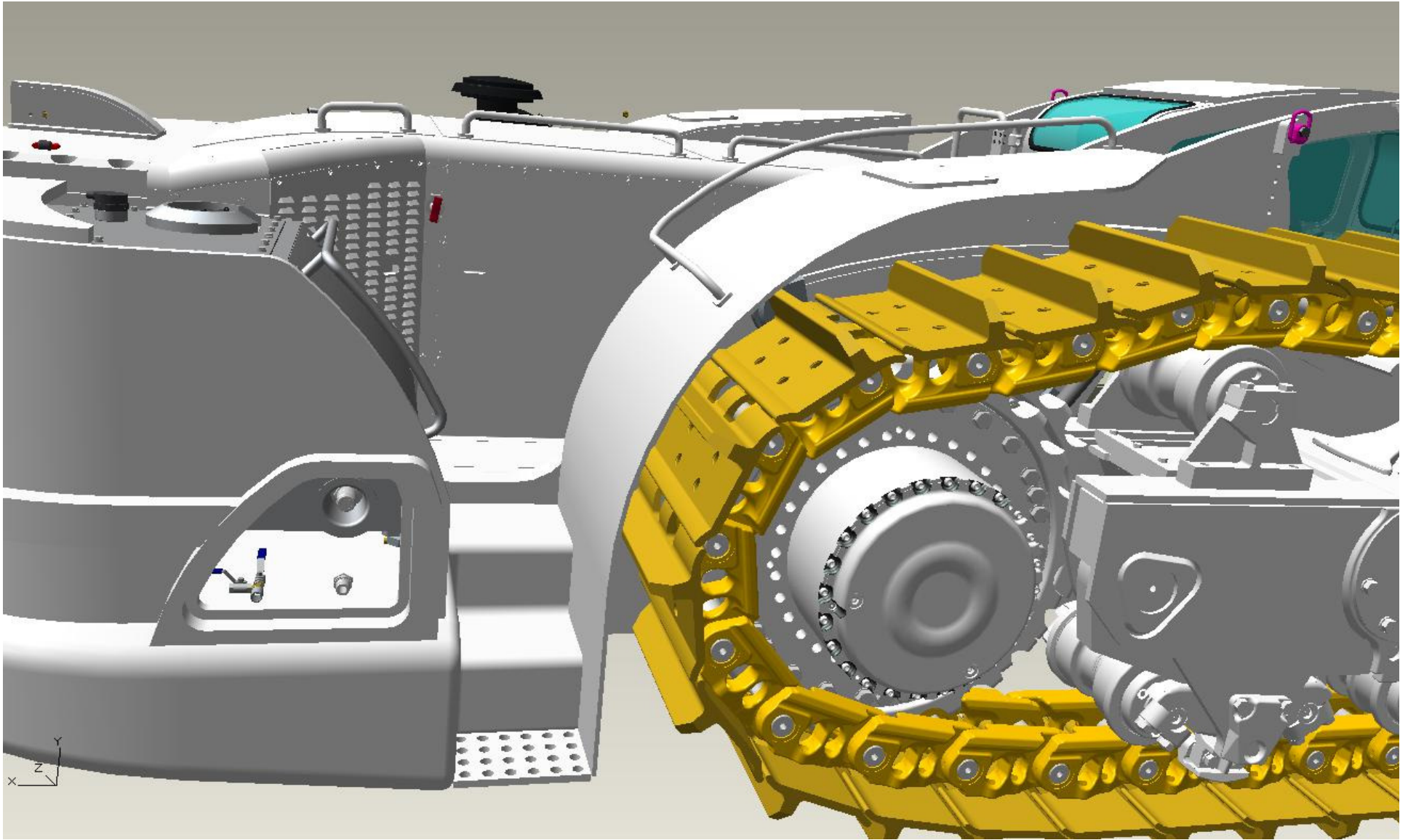
- Implement positioned close to front of track to maximise lift capacity



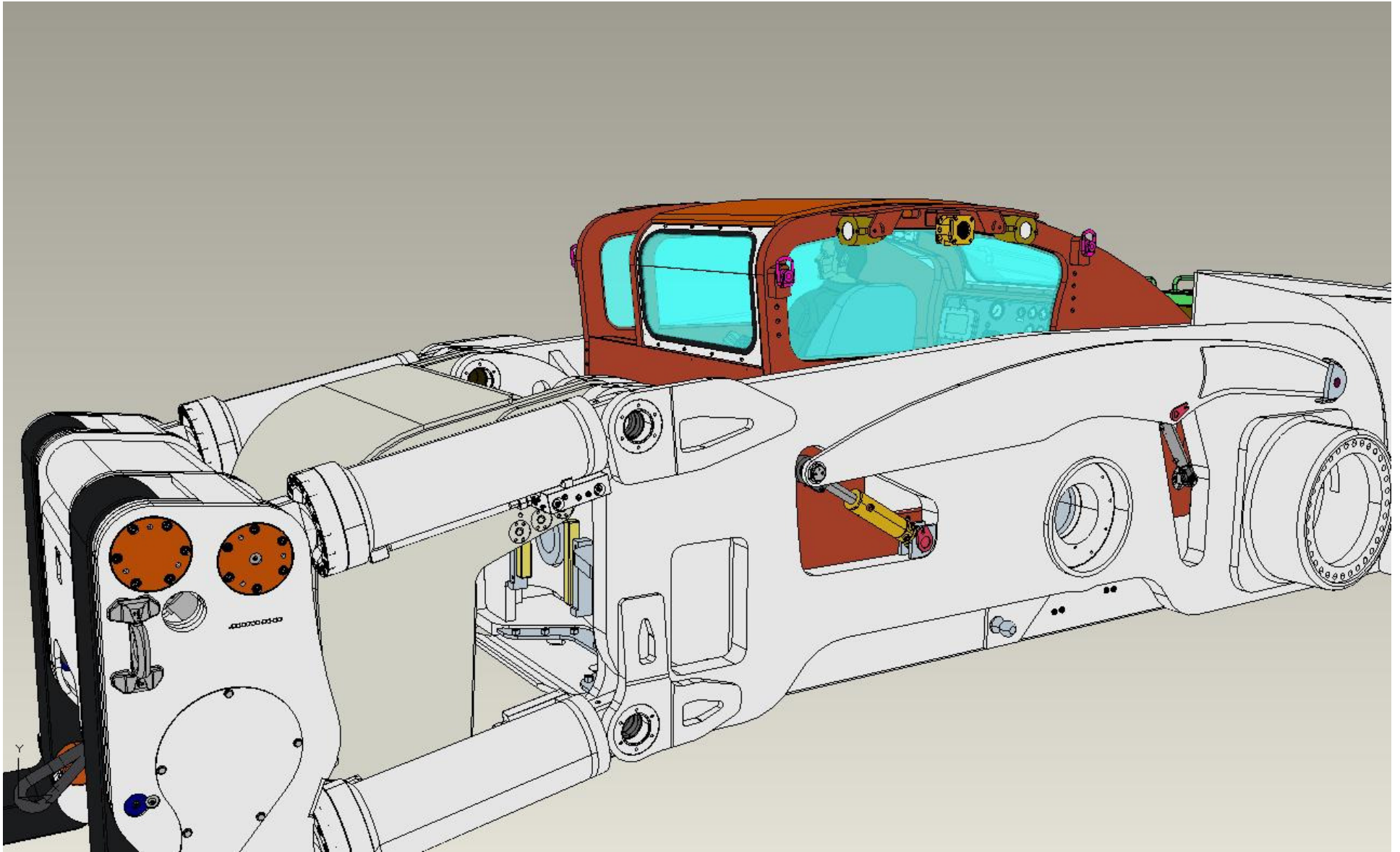
- Cabin position between Cat cross shaft and equaliser beam



- Access integrated into machine chassis design and component layout



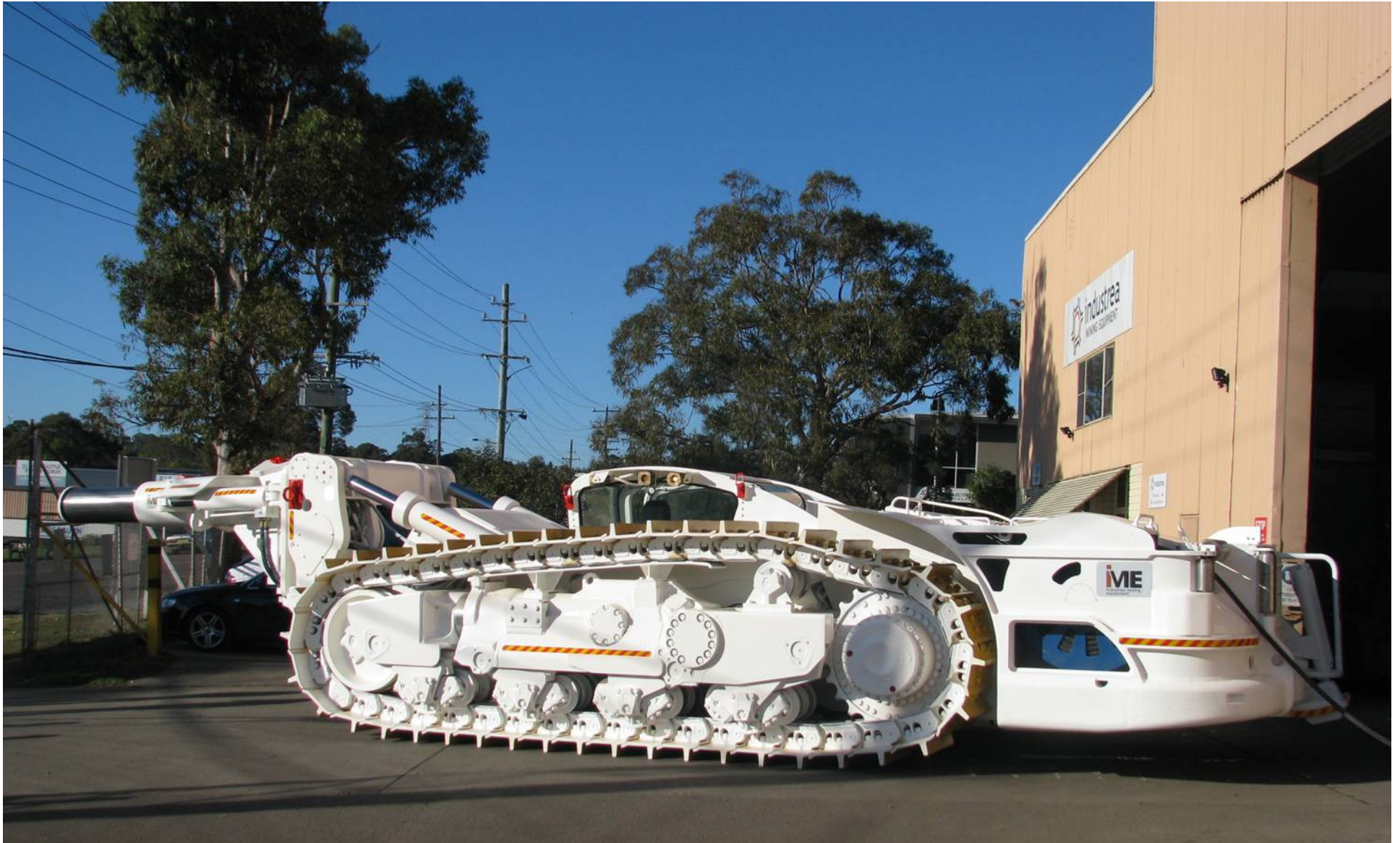
- Steps, hand rails and round edges feature on covered access to cabin



- Cabin Height Adjustment Mechanism



- Cabin in Low Height Position



- Cabin in raised position



- Canopy removed to show cabin layout



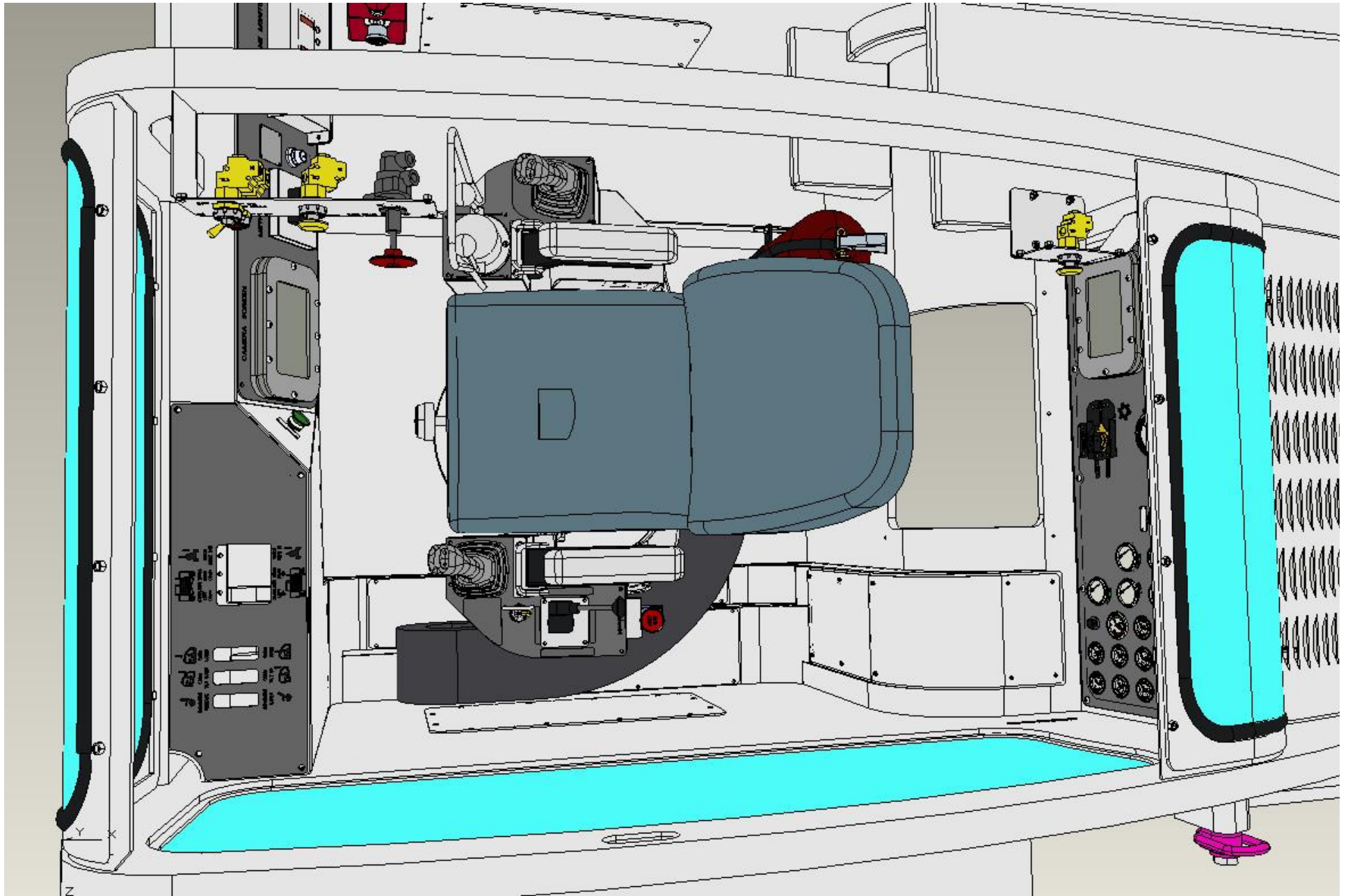
- Start Panel



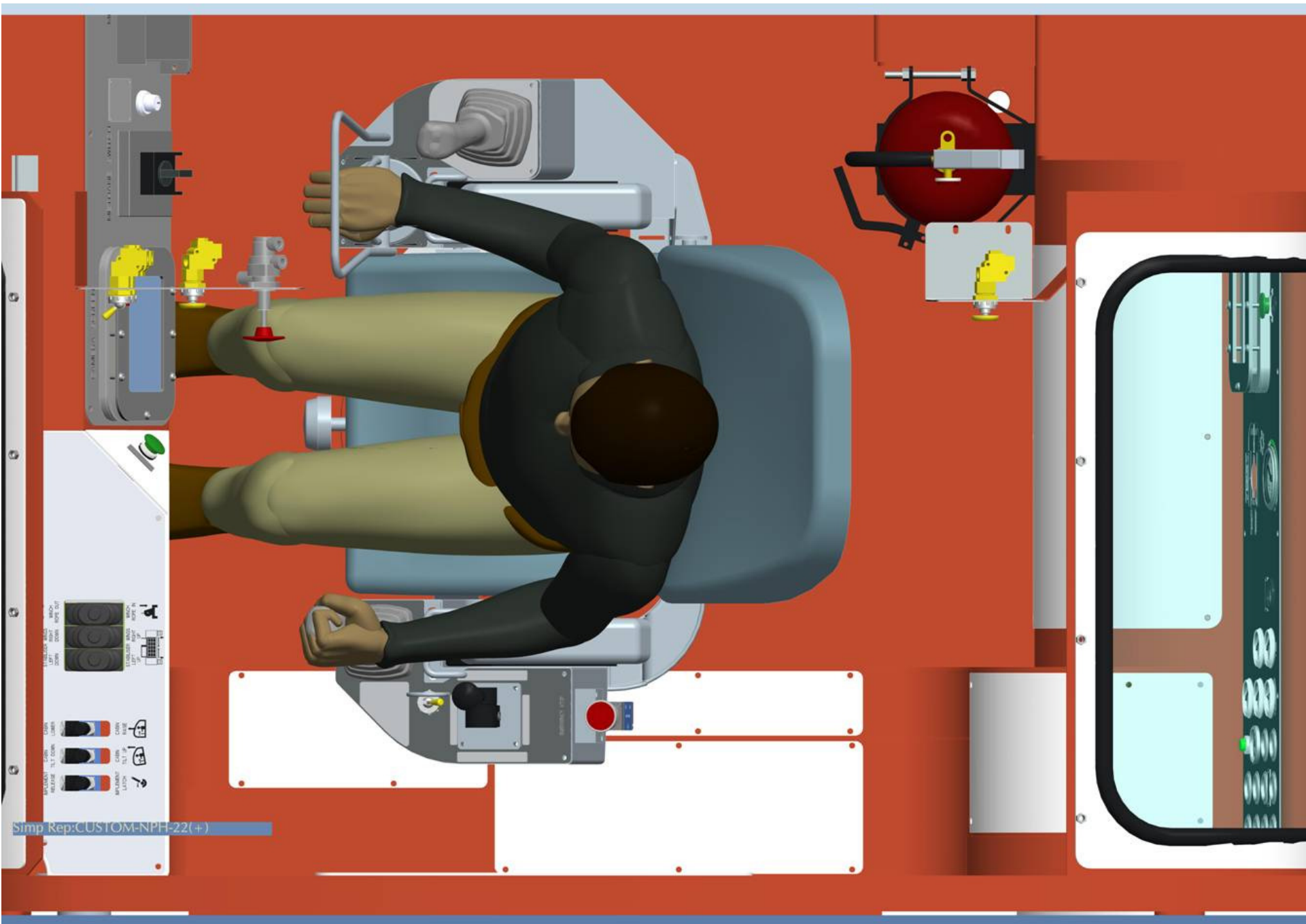
- Front panel, Camera and Methane systems



- Rear panel with
- Camera screen
- Gauges
- Light mode selector

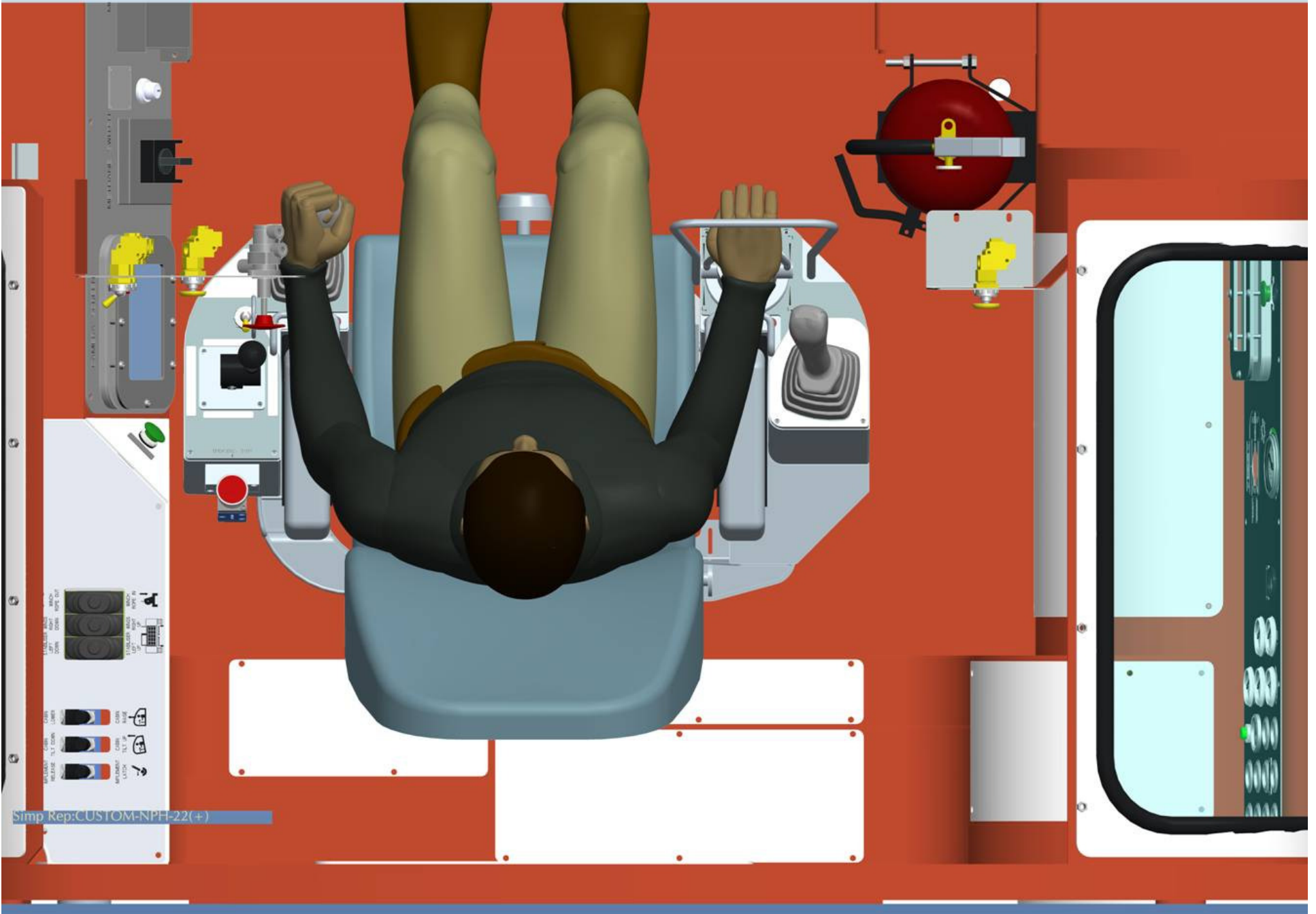


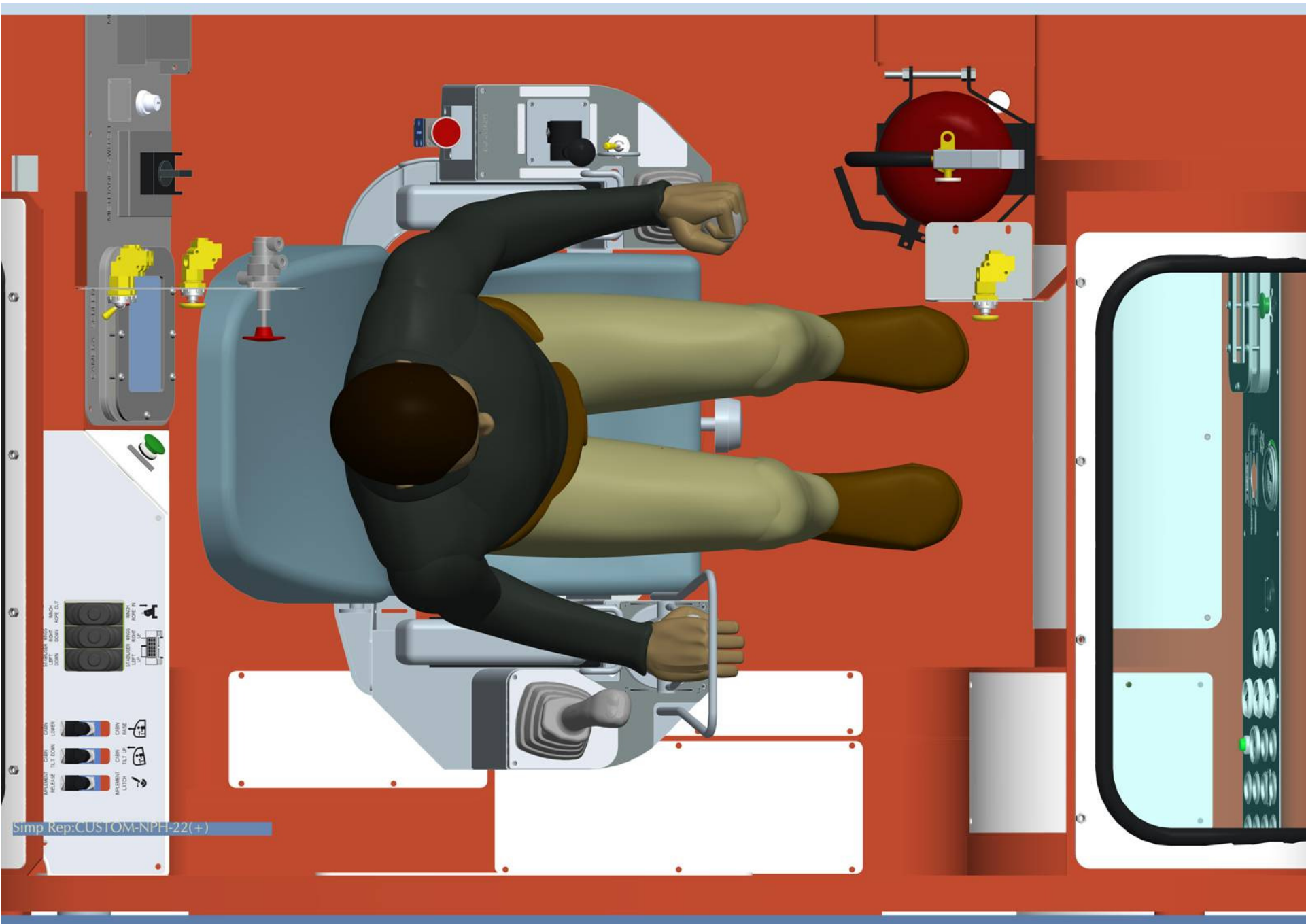
- Cabin Plan – Seat facing forward



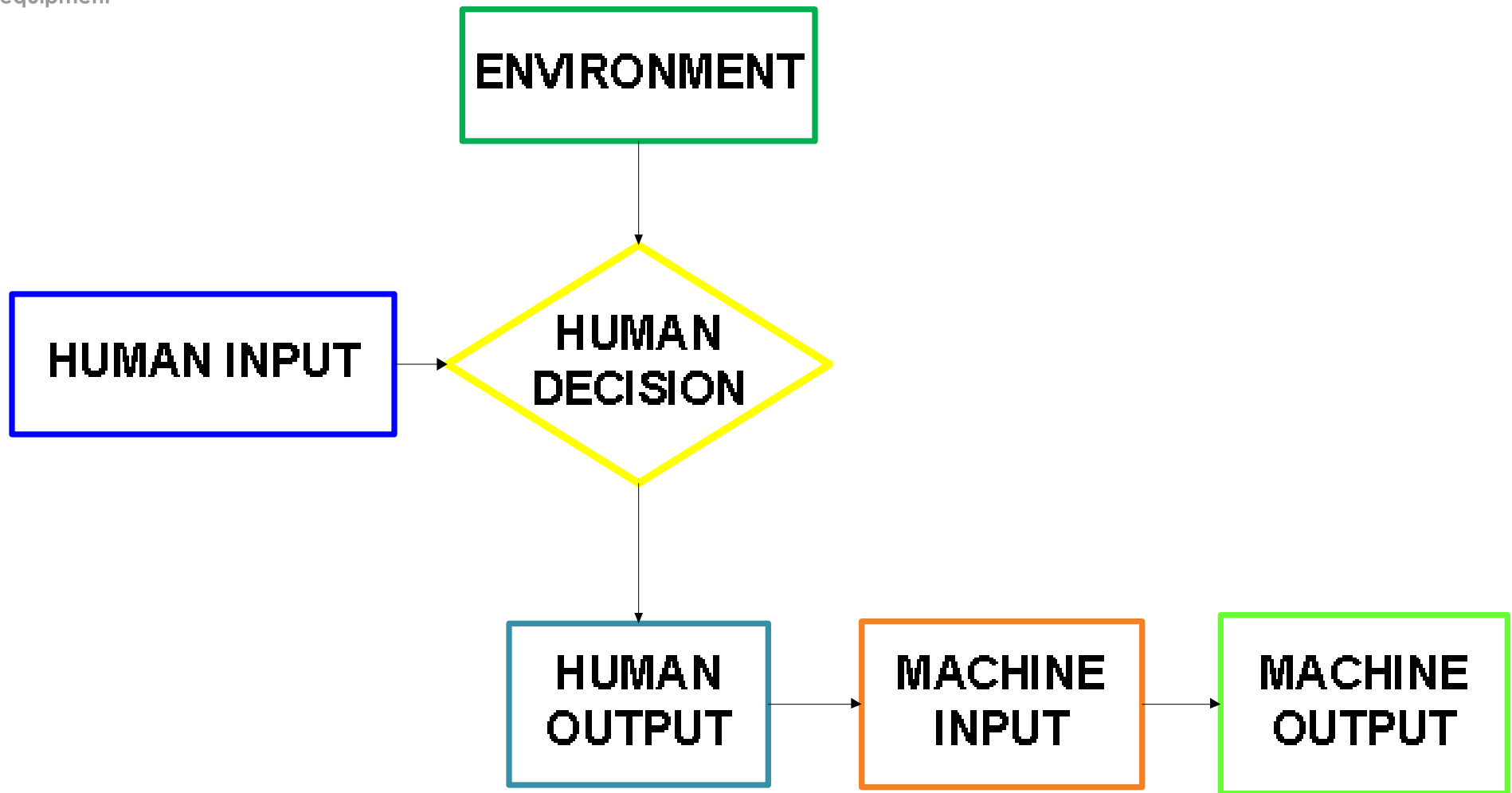
Simp Rep: CUSTOM-NPH-22(+)

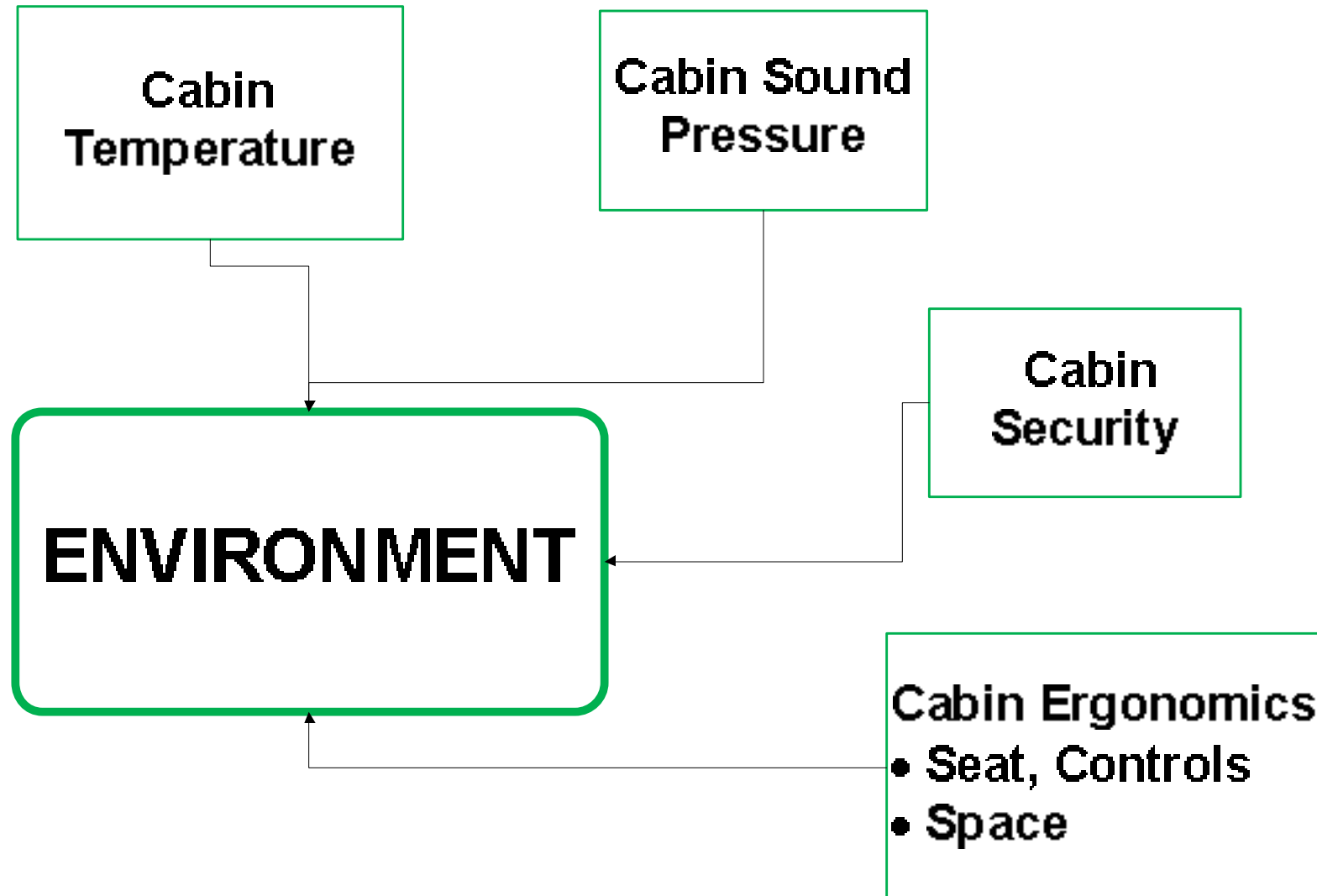
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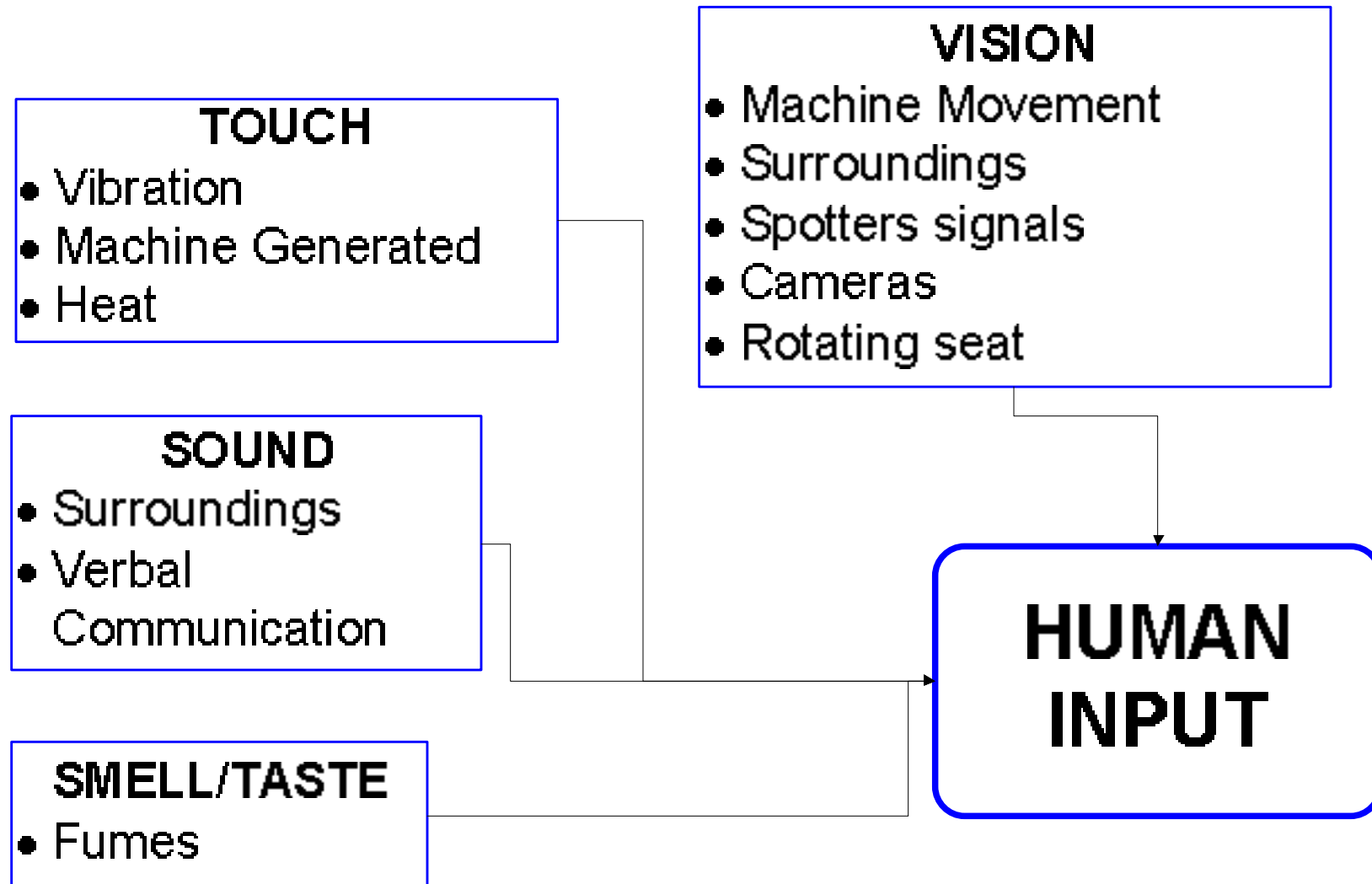


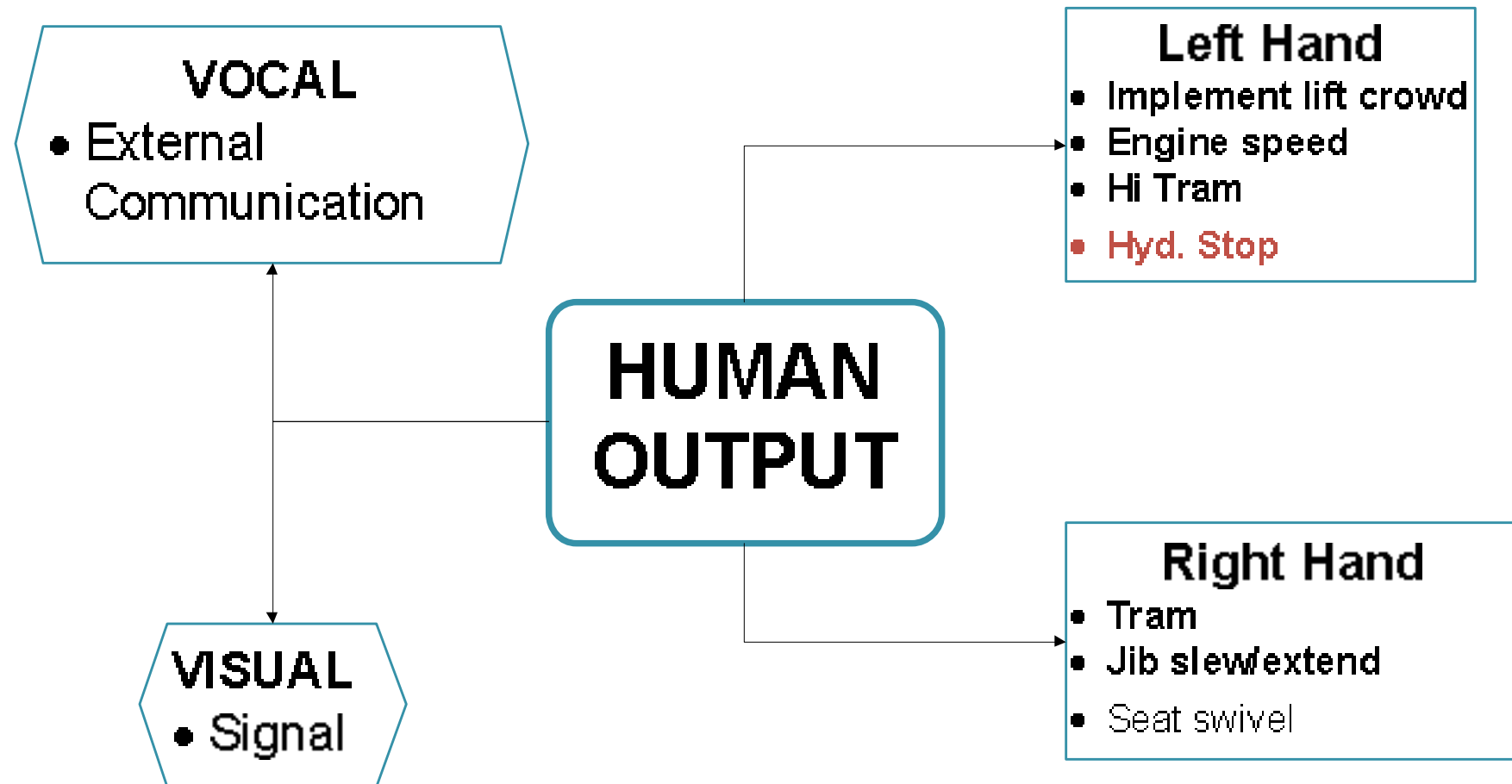


Simp Rep: CUSTOM-NPH-22(+)

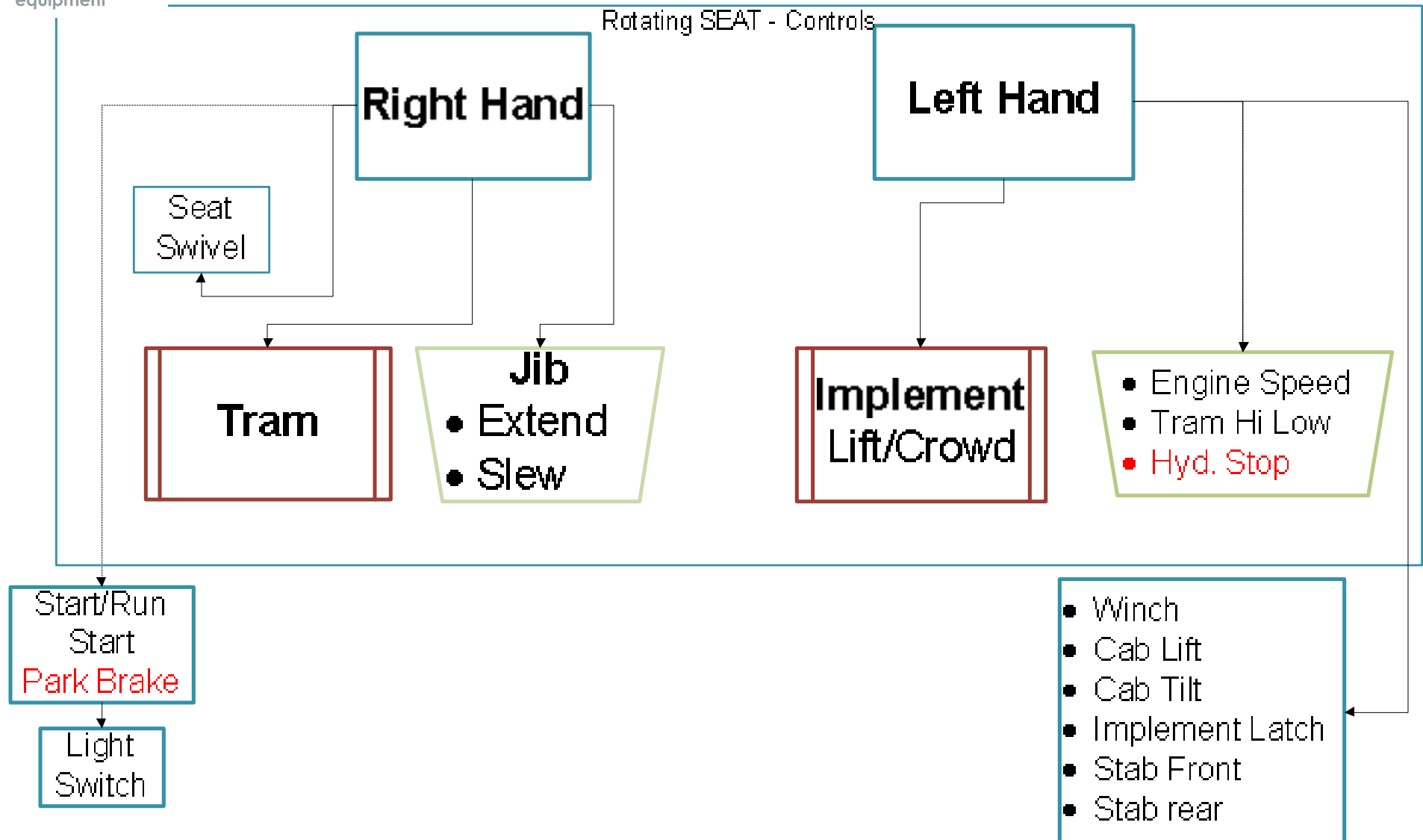


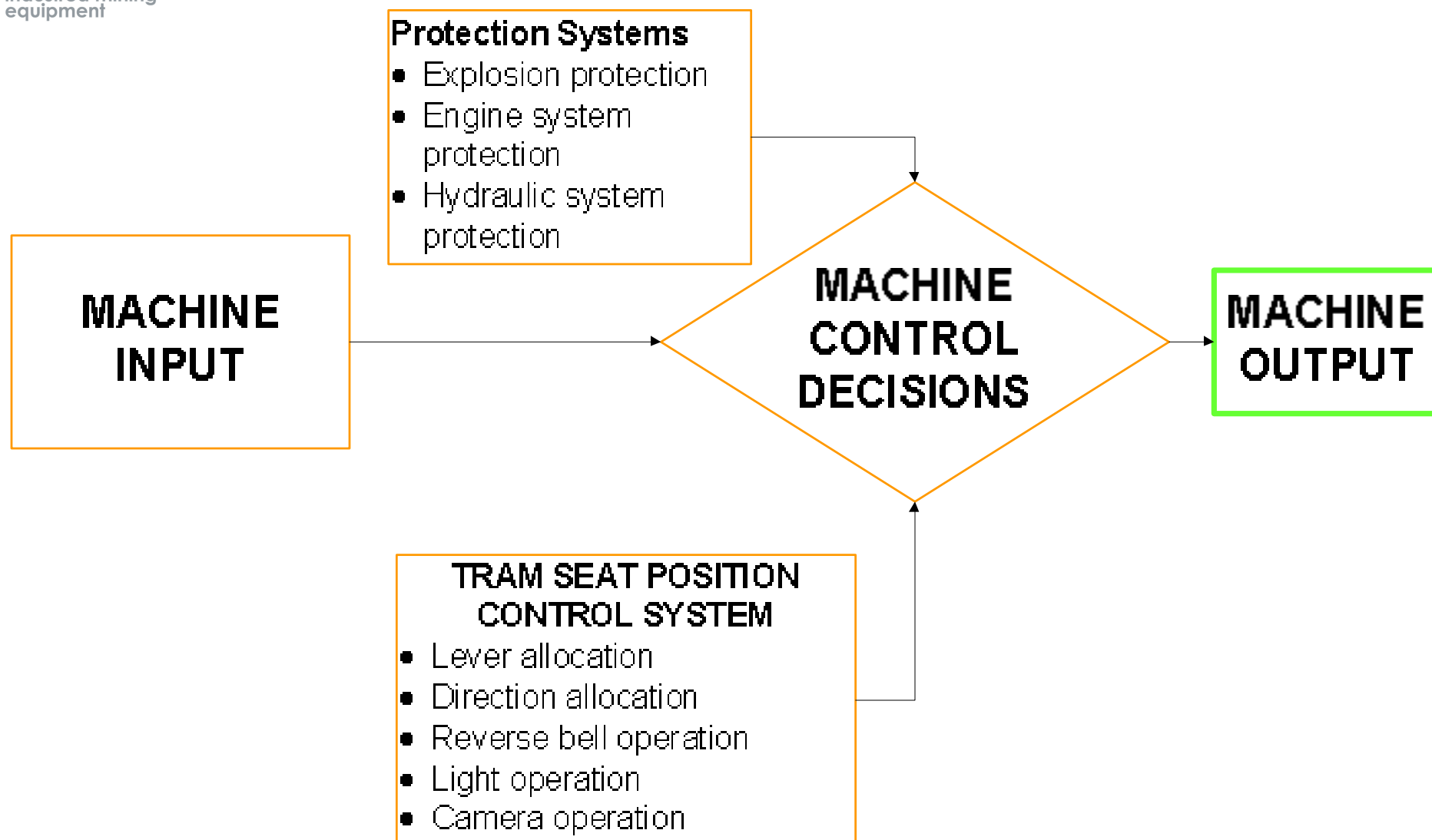


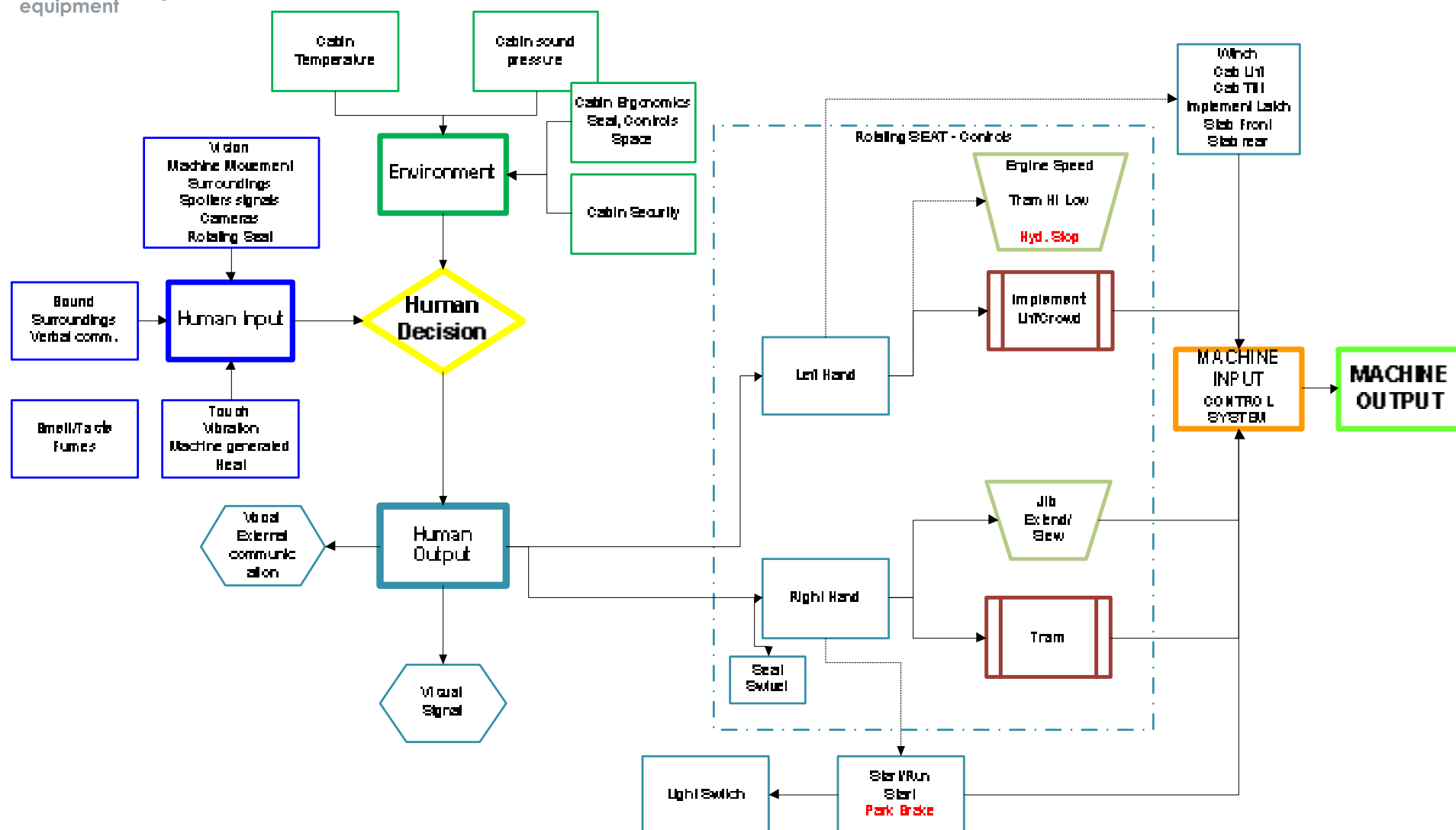




Rotating SEAT - Controls









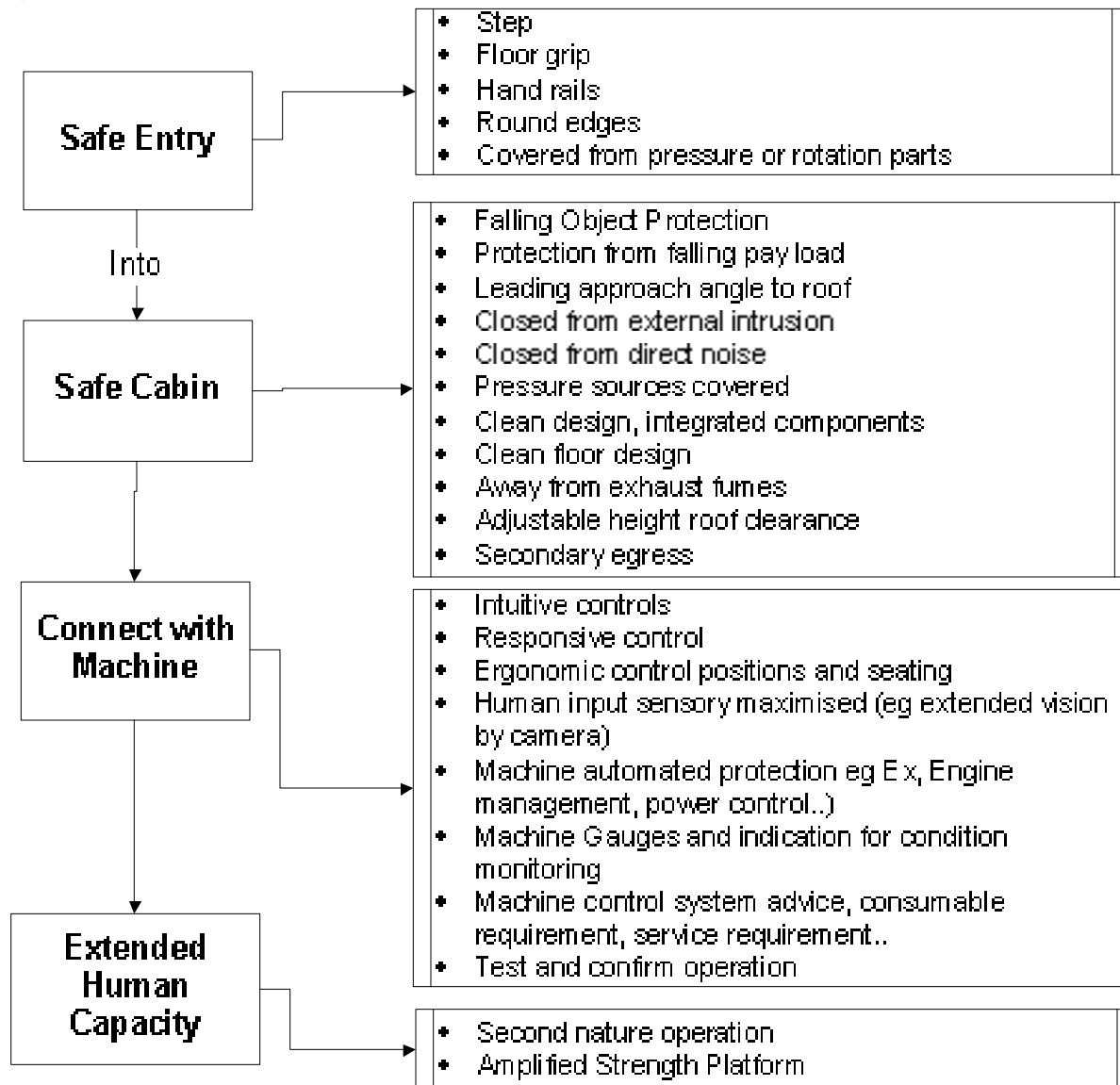
Avatar AMP

—

Amplified
Mobility
Platform



- DOZER
- Amplified Strength Platform



















Manikin Software

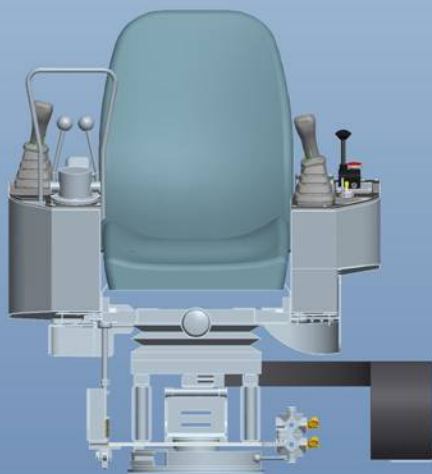
- PTC Manikin is an extension to Pro Engineer software
- Insert and manipulate standards based 3D human models into machinery models
- Generate human reach envelopes and vision cones
- See the operators view!!

Library

Tools ▾

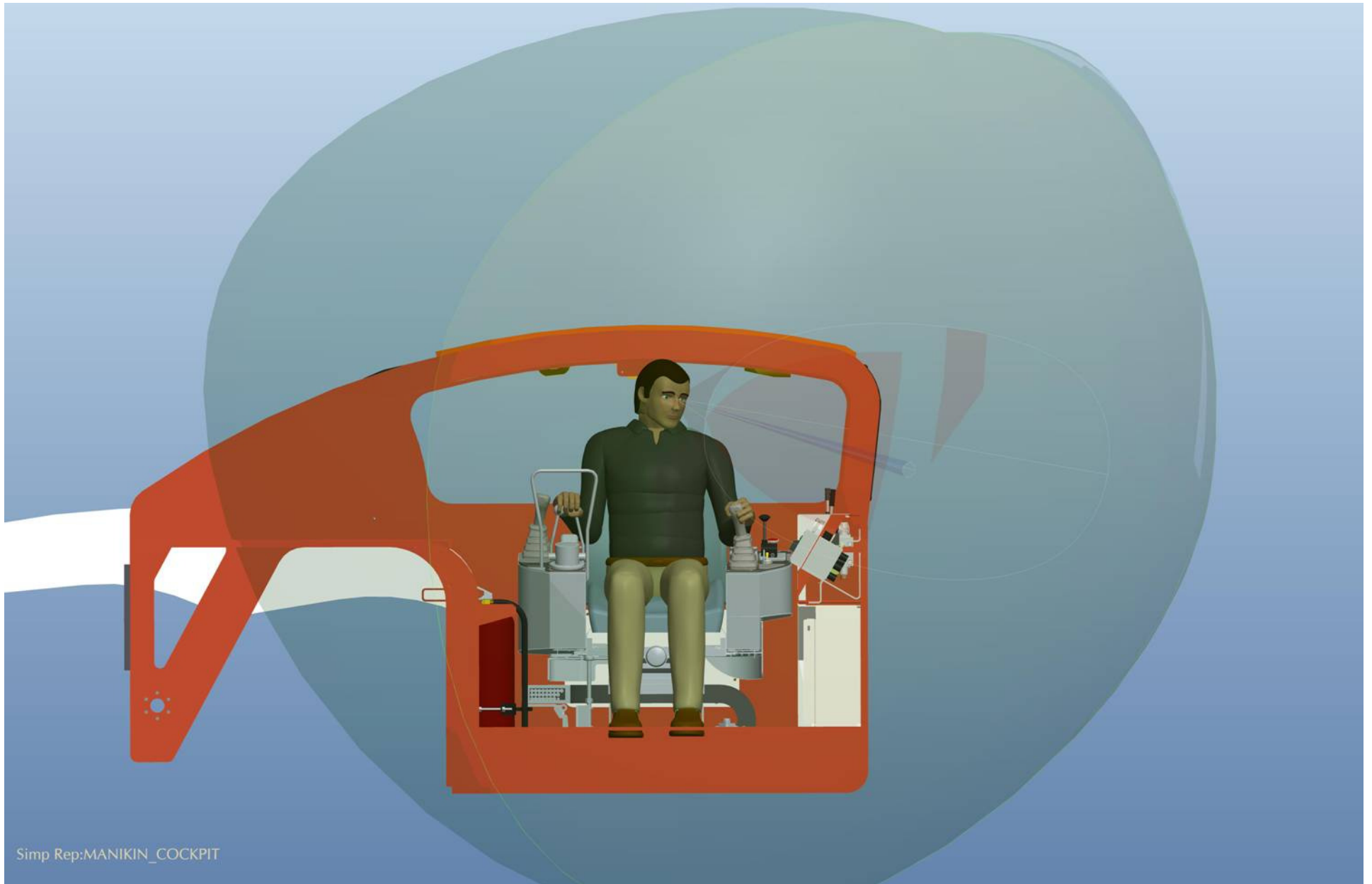
Name	Gender	Country	Percentile	Height(m)	Weight(kg)
 kidm10_us_50.asm	male	USA	50	1.35	30.5
 kidm5_us_50.asm	male	USA	50	1.08	18.3
 m_cn_5.asm	male	CHINA	5	1.57	40.74
 m_cn_50.asm	male	CHINA	50	1.68	59
 m_cn_95.asm	male	CHINA	95	1.79	77.26
 m_it_5.asm	male	ITALY	5	1.61	61.1
 m_it_50.asm	male	ITALY	50	1.71	76.19
 m_it_95.asm	male	ITALY	95	1.82	103.5
 m_jp_5.asm	male	JAPAN	5	1.61	50.1
 m_jp_50.asm	male	JAPAN	50	1.71	63.3
 m_jp_95.asm	male	JAPAN	95	1.82	76.6
 m_nl_5.asm	male	NETHERLANDS	5	1.67	62.11
 m_nl_50.asm	male	NETHERLANDS	50	1.81	85.57
 m_nl_95.asm	male	NETHERLANDS	95	1.96	117.02
 m_us_5.asm	male	USA	5	1.65	55.89
 m_us_50.asm	male	USA	50	1.77	84.9

- Manikin statistical data base

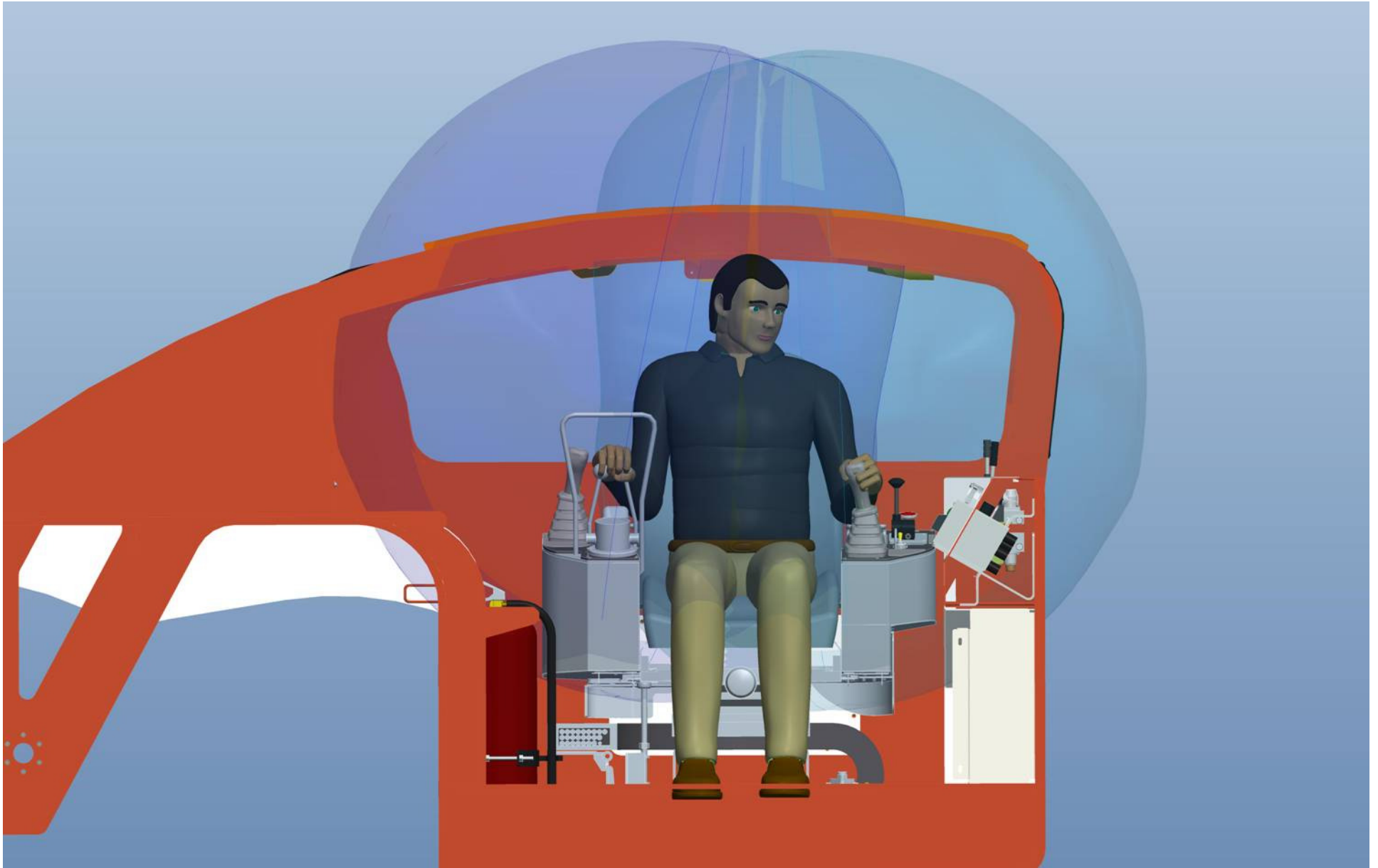




- Primary vision cone



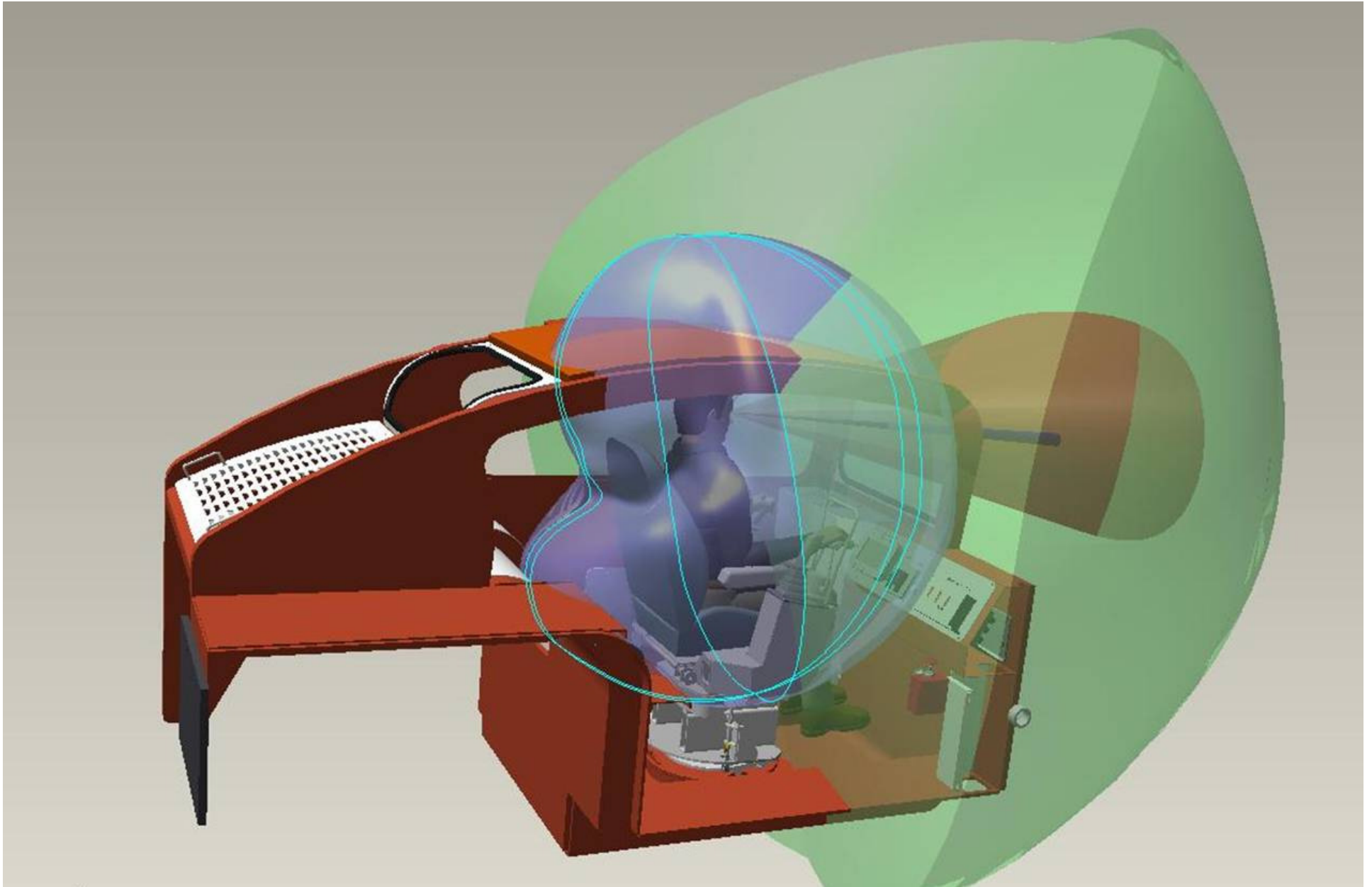
- Peripheral vision cones



- Reach envelope



- Operators Vision



- Primary vision, peripheral vision and RH reach envelope

Conclusion

- As the size of machinery grows, cameras provide effective means of supplementing vision. Integrate components at the design stage.
- Advances in Human Factors/Ergonomics can be made by using a structured Human Machine Model to guide the designer through the necessary detail.
- 'Manikin' software can assist analysis of human factors in underground coal machinery and is now available to a modern design office.



Longwall Chock Carrier LWC-70T & Dozer DZR-70T

www.industrea.com.au