



An Axiometrix Solutions Brand



45BD AutoKEMAR

Product Introduction

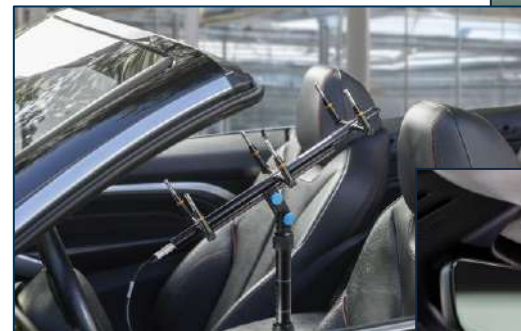
Methods for In-cabin Acoustic Tests

Common measurement approaches

- Single microphones
- Microphone arrays
- Test headsets
- Artificial heads / HATS

Each method has strengths and limitations.

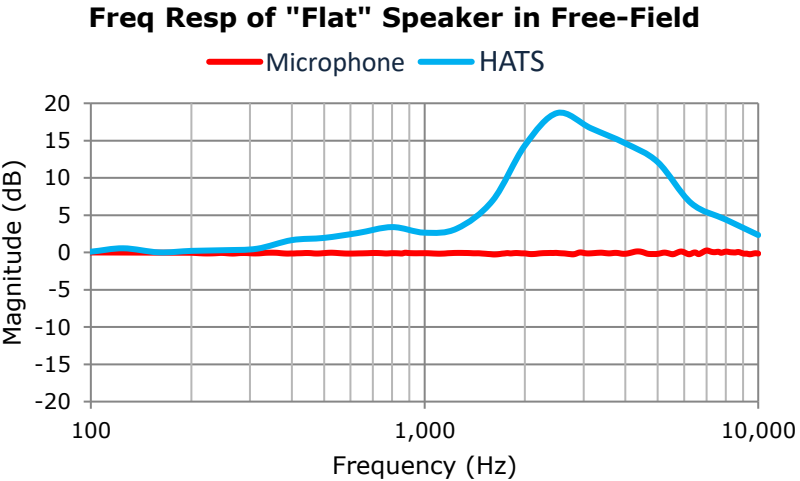
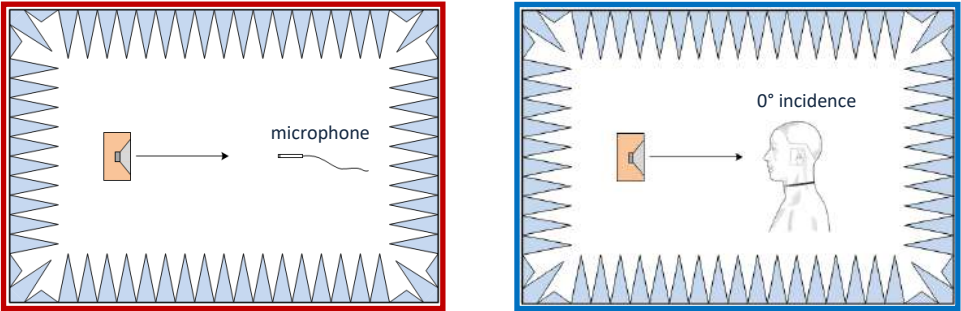
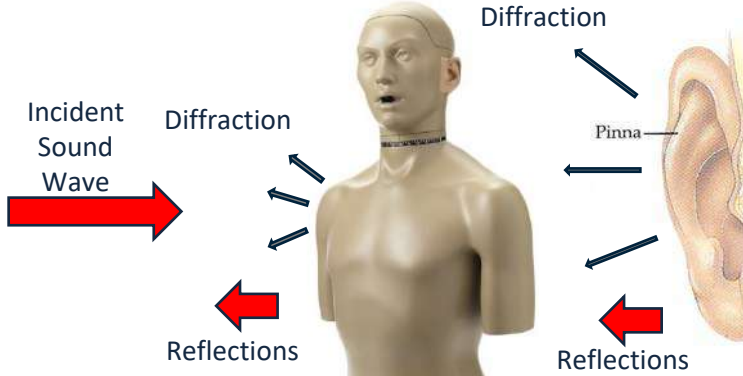
Artificial heads are essential when human body influence matters.



Why Artificial Heads (HATS)

Why do we use them?

- Mimics the shape and acoustic influence of a real person
- Alters the sound field realistically
- Our ears are not flat-response microphones



Introducing AutoKEMAR

AutoKEMAR – KEMAR designed for Automotive

- GRAS 45BD AutoKEMAR
- Built on the proven KEMAR platform
- Designed specifically for in-cabin automotive testing
- Purpose-built seat mount
- Automotive-focused movement and positioning
- Rattle-free design





AutoKEMAR value proposition

What makes AutoKEMAR different?

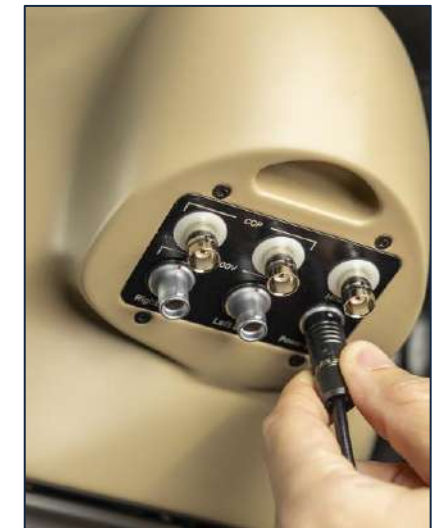
- Automotive-first design
- Widest and most flexible positioning on the market
- Secure ISOFIX seat mounting
- Modular and user-reconfigurable
- Human-like design
- Optional mouth simulator
- Open compatibility with standard DAQs
- Competitive pricing



AutoKEMAR

The Artificial Head

- Human-like head
- New design
- Shoulders / Short torso
- Neck angle
- Natural seating position
- Easy-access connectors
- Handles
- Base locking mechanism
- 120° neck manual rotation



The Seat Mount (Key Differentiator)

Designed for automotive seats

Designed for Automotive Seats

- ISOFIX-compatible for secure mounting
- Designed to fit real car seats
- Stable, vibration-resistant, rattle-free
- Allows large positioning freedom inside the cabin

This is where most competitive solutions fall short!



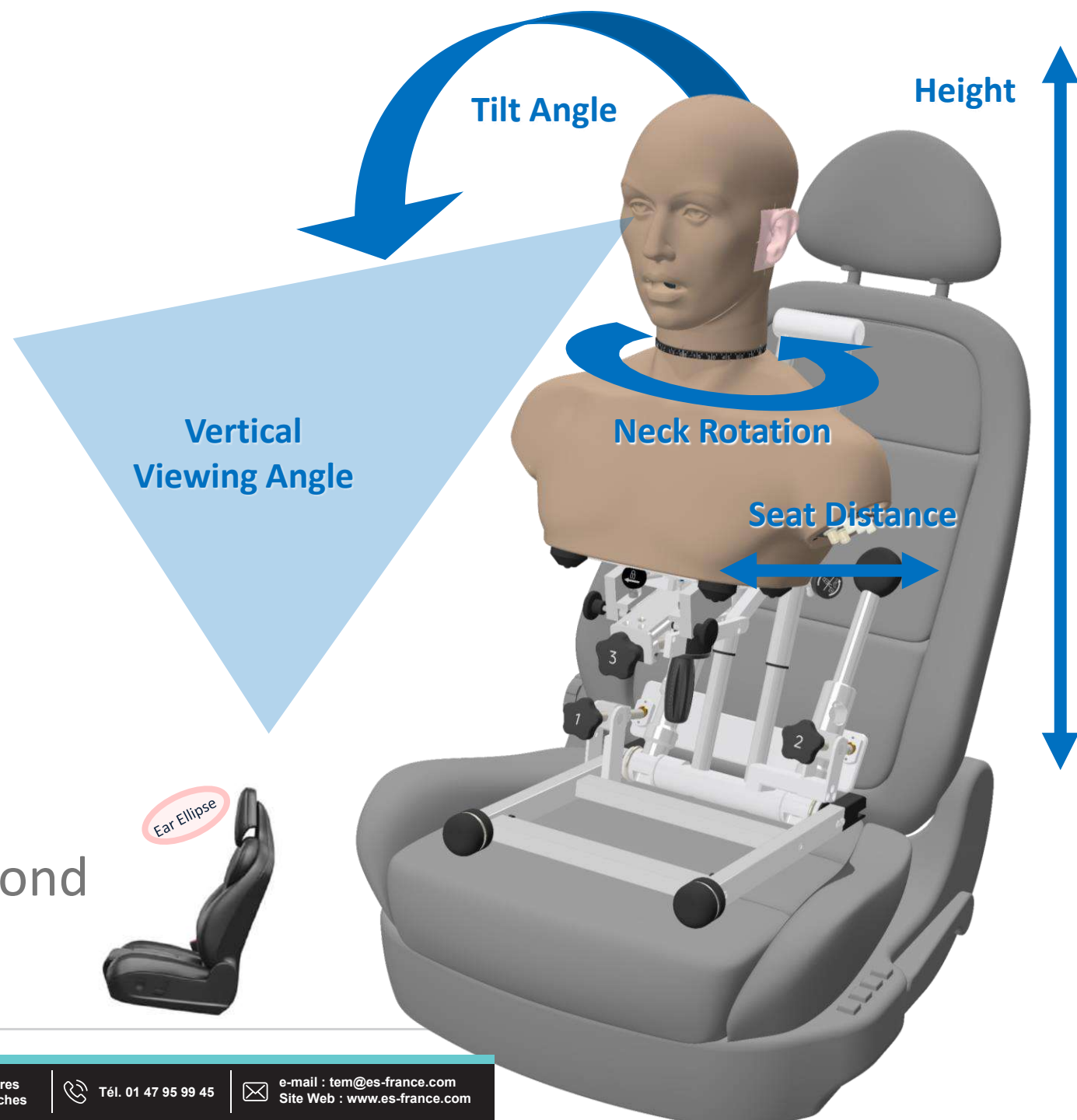
Movement Capabilities

Widest positioning range on the market

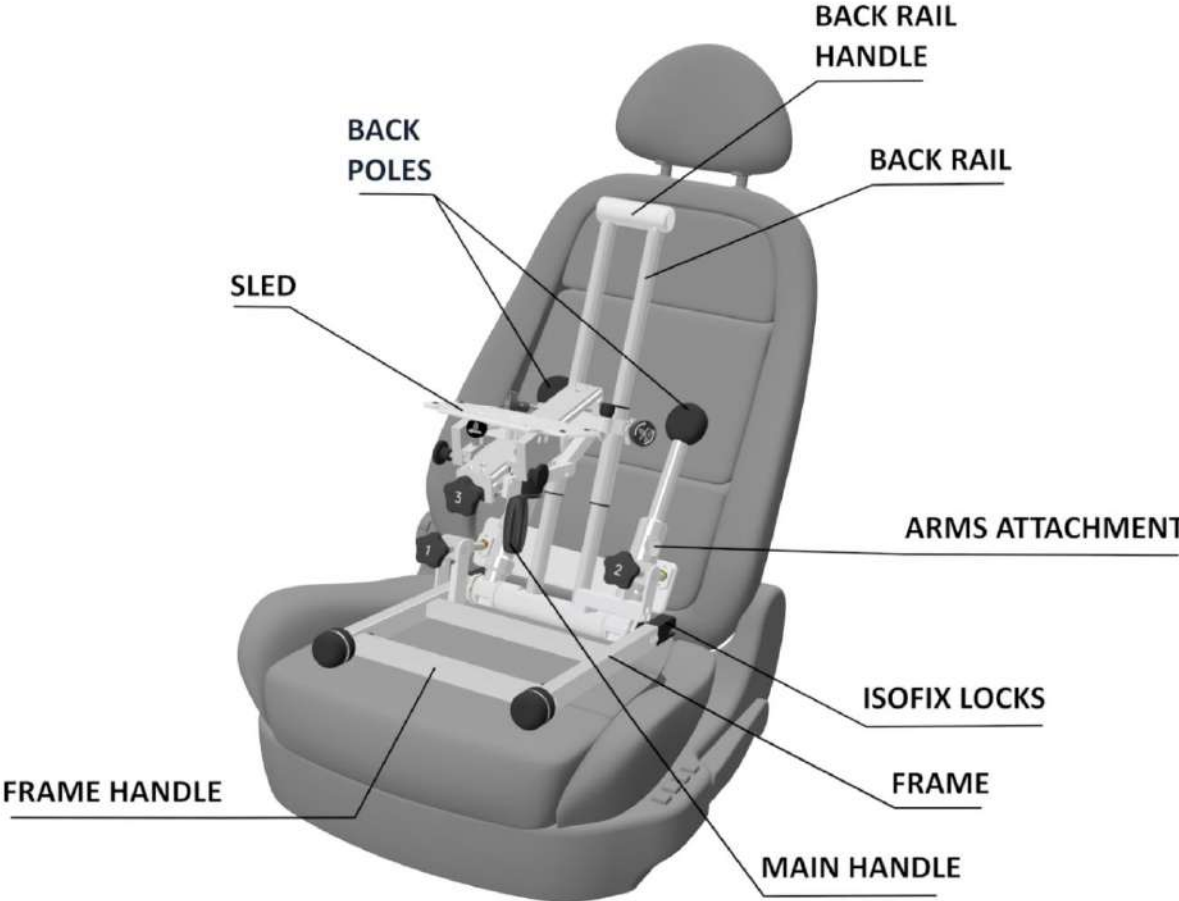
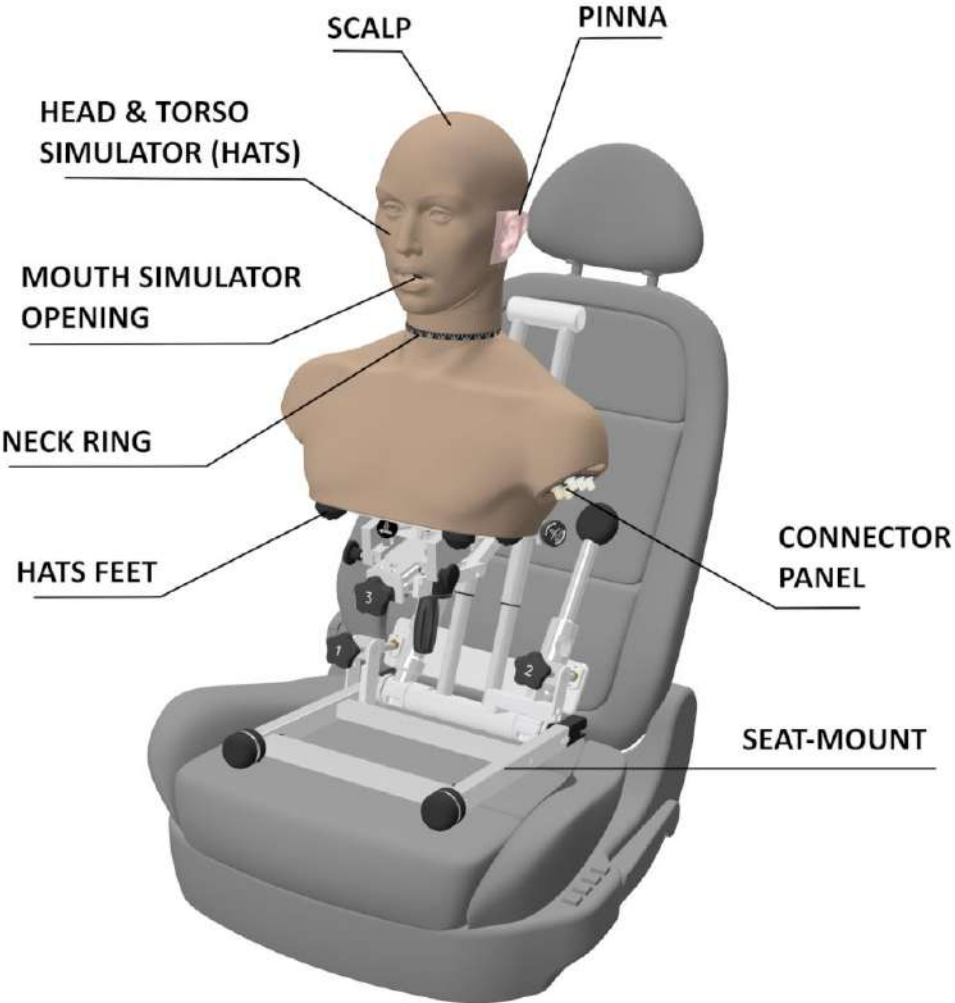
Manual adjustments of:

- Neck rotation ($\pm 120^\circ$)
- Seat distance adjustment
- Height adjustment
- Forward/backward tilt
- Viewing angle adjustment

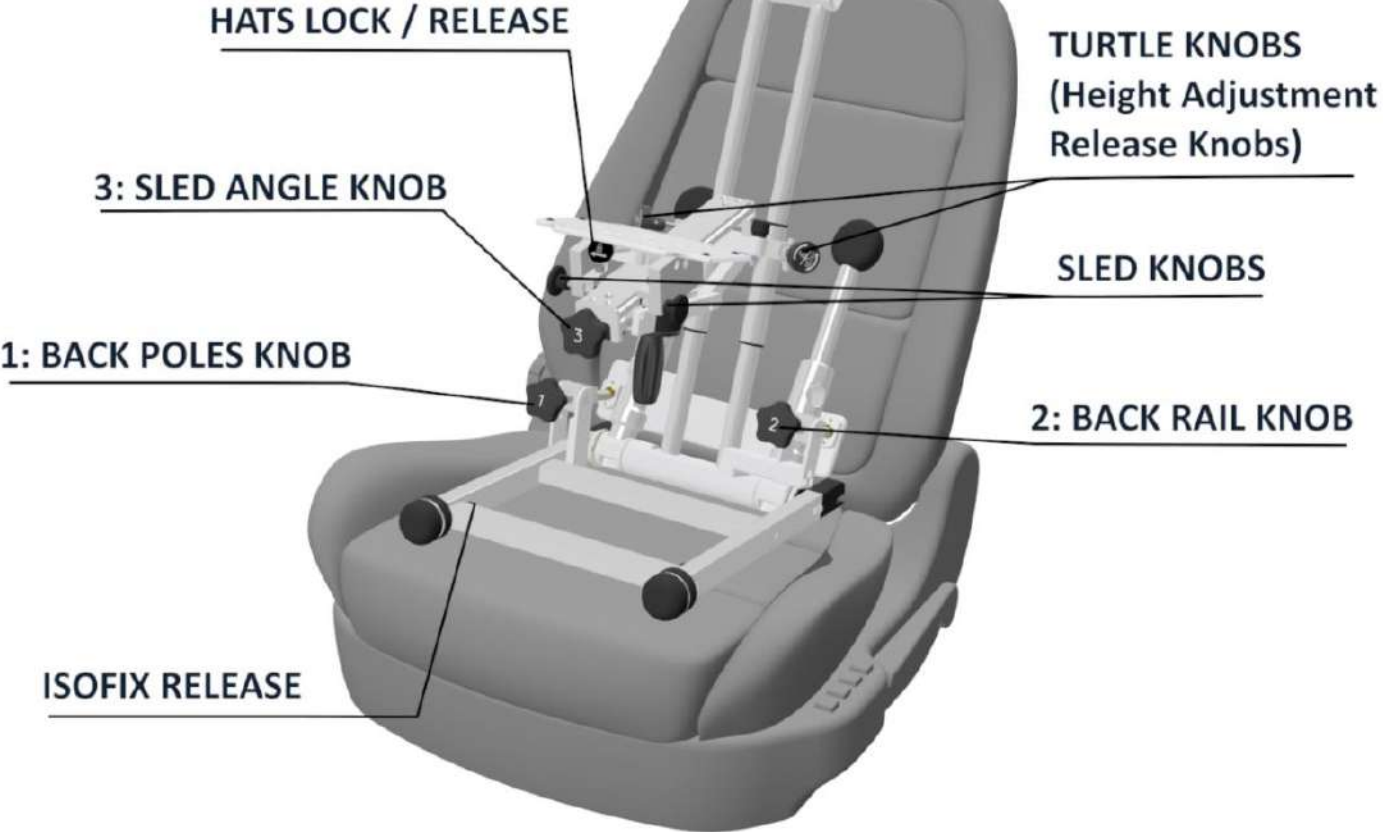
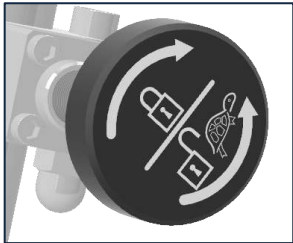
Covers the full **ear ellipse** and beyond



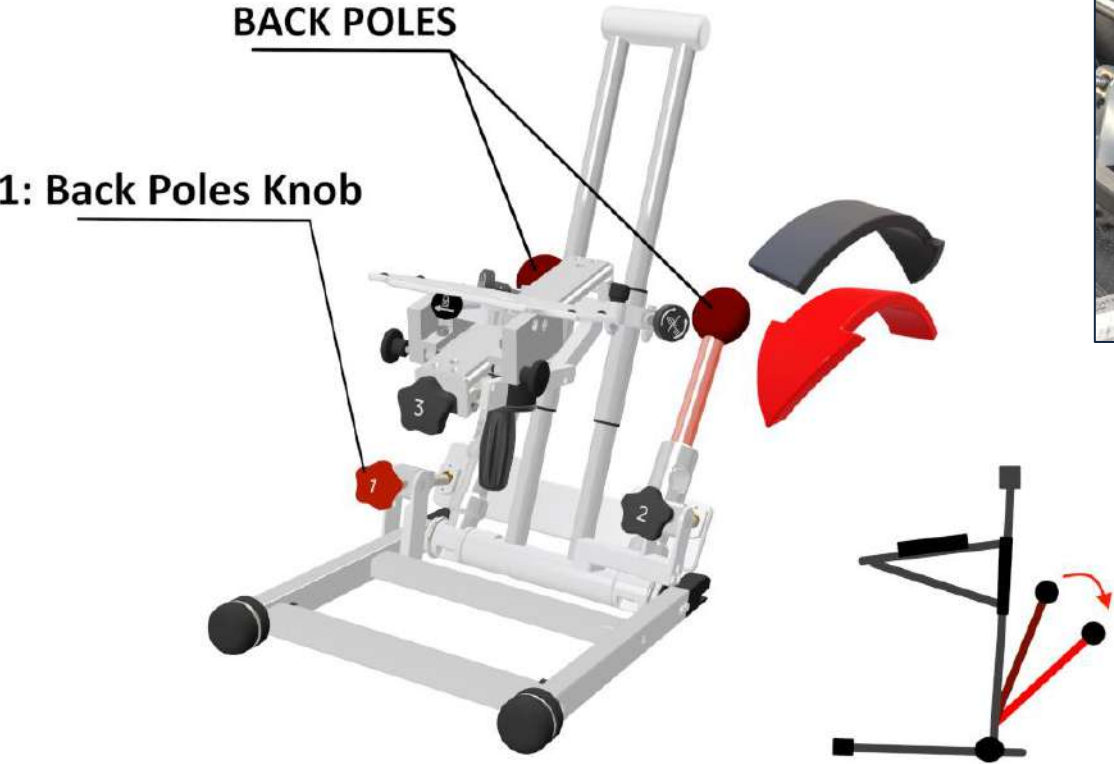
AutoKEMAR Parts



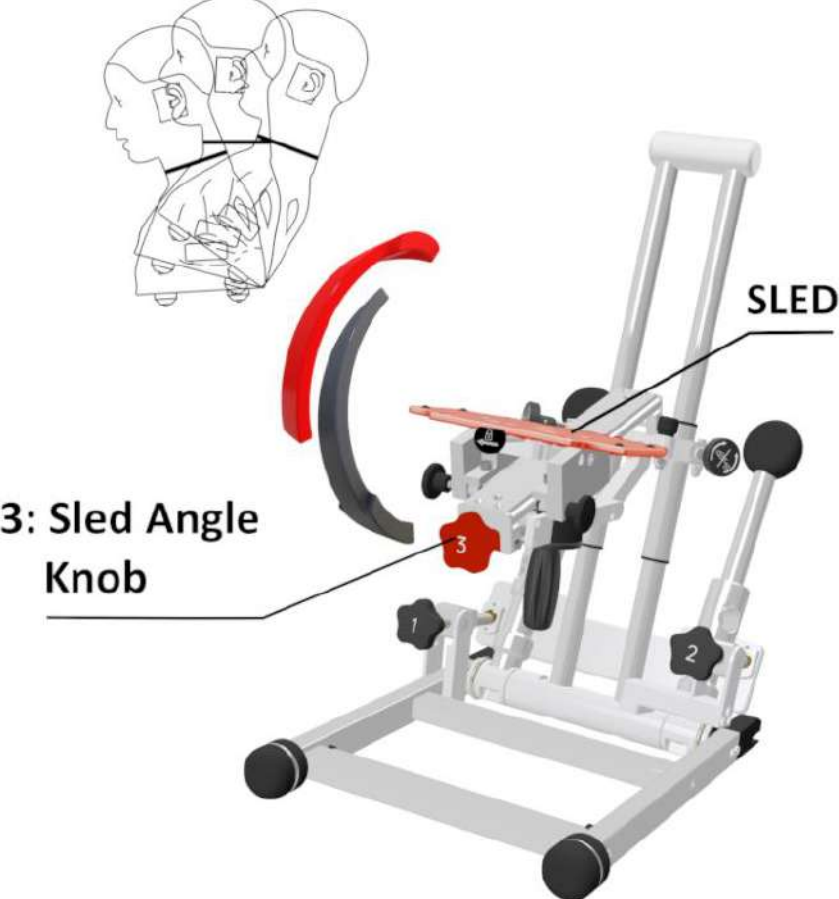
Seat Mount Controls



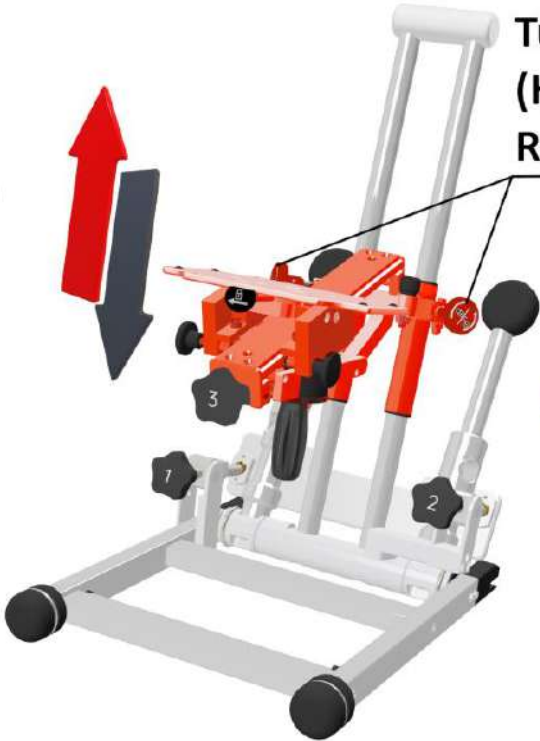
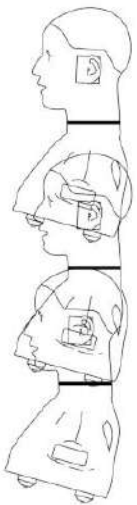
Seat Mount Operation



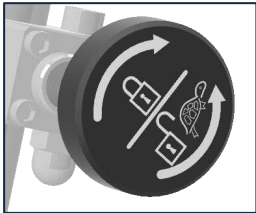
Seat Mount Operation



Seat Mount Operation



Turtle Knobs
(Height Adjustment
Release Knobs)



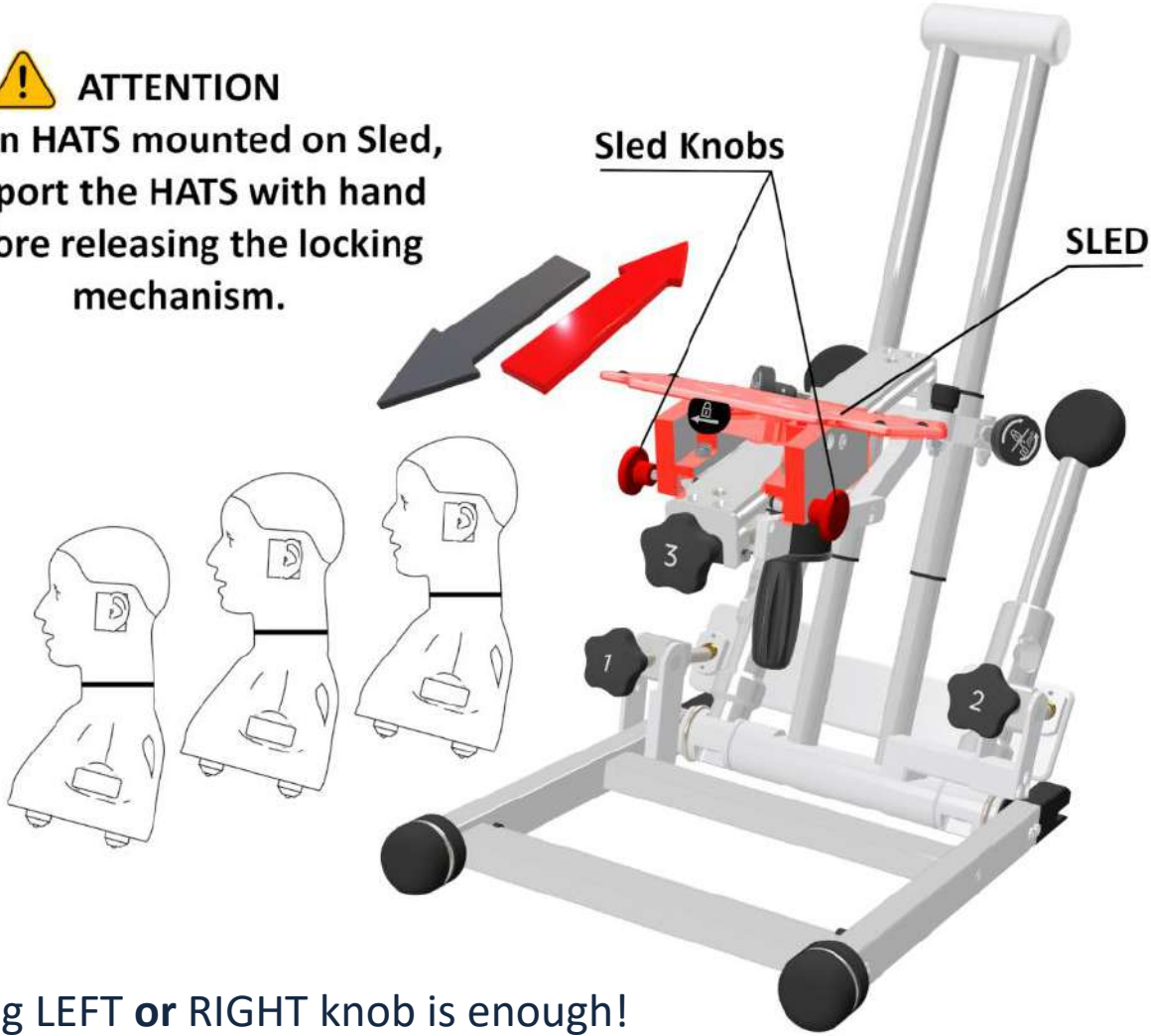
! ATTENTION
Support the load by
the Main Handle before
releasing the Turtle Knobs

Using LEFT or RIGHT knob is enough!

Seat Mount Operation

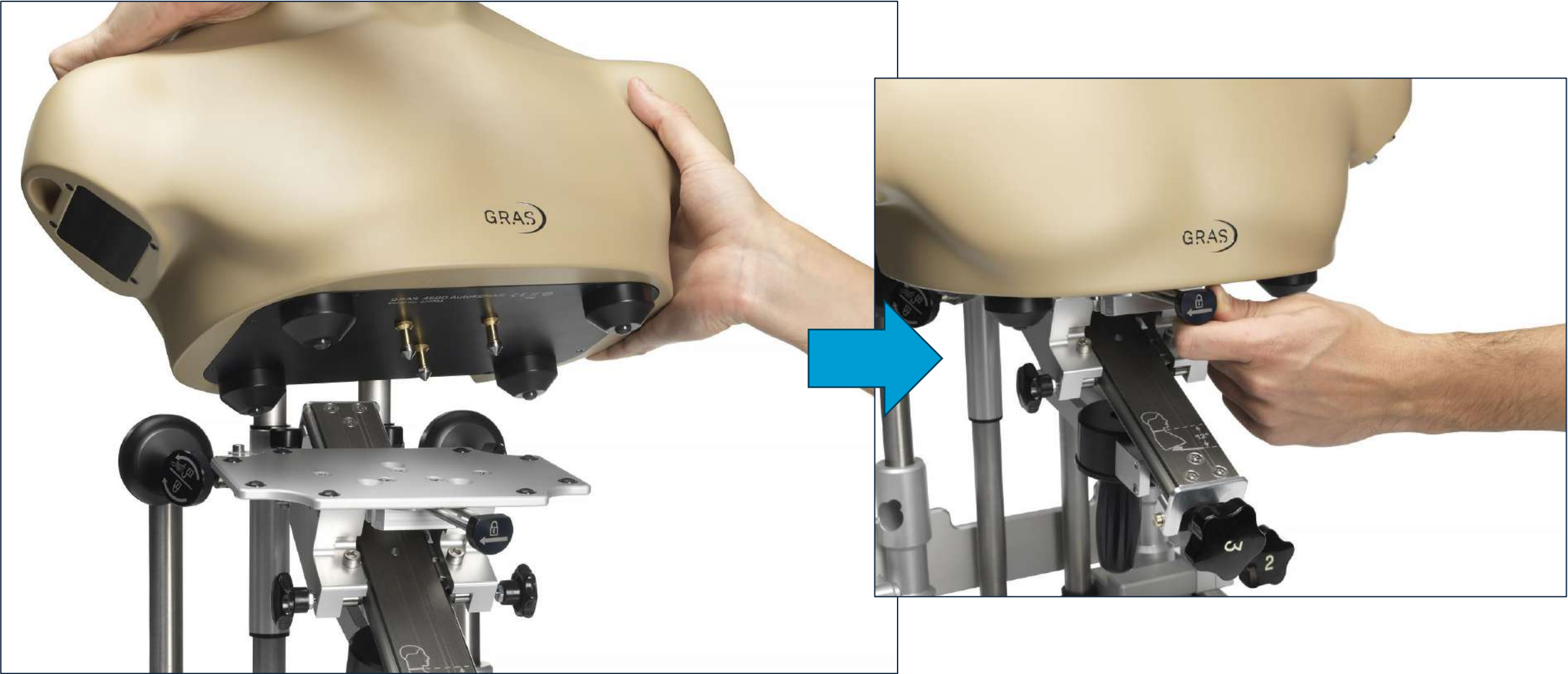


⚠ ATTENTION
When HATS mounted on Sled,
support the HATS with hand
before releasing the locking
mechanism.



Using LEFT or RIGHT knob is enough!

HATS lock/release mechanism



Neck Rotation

Using Finger Screw



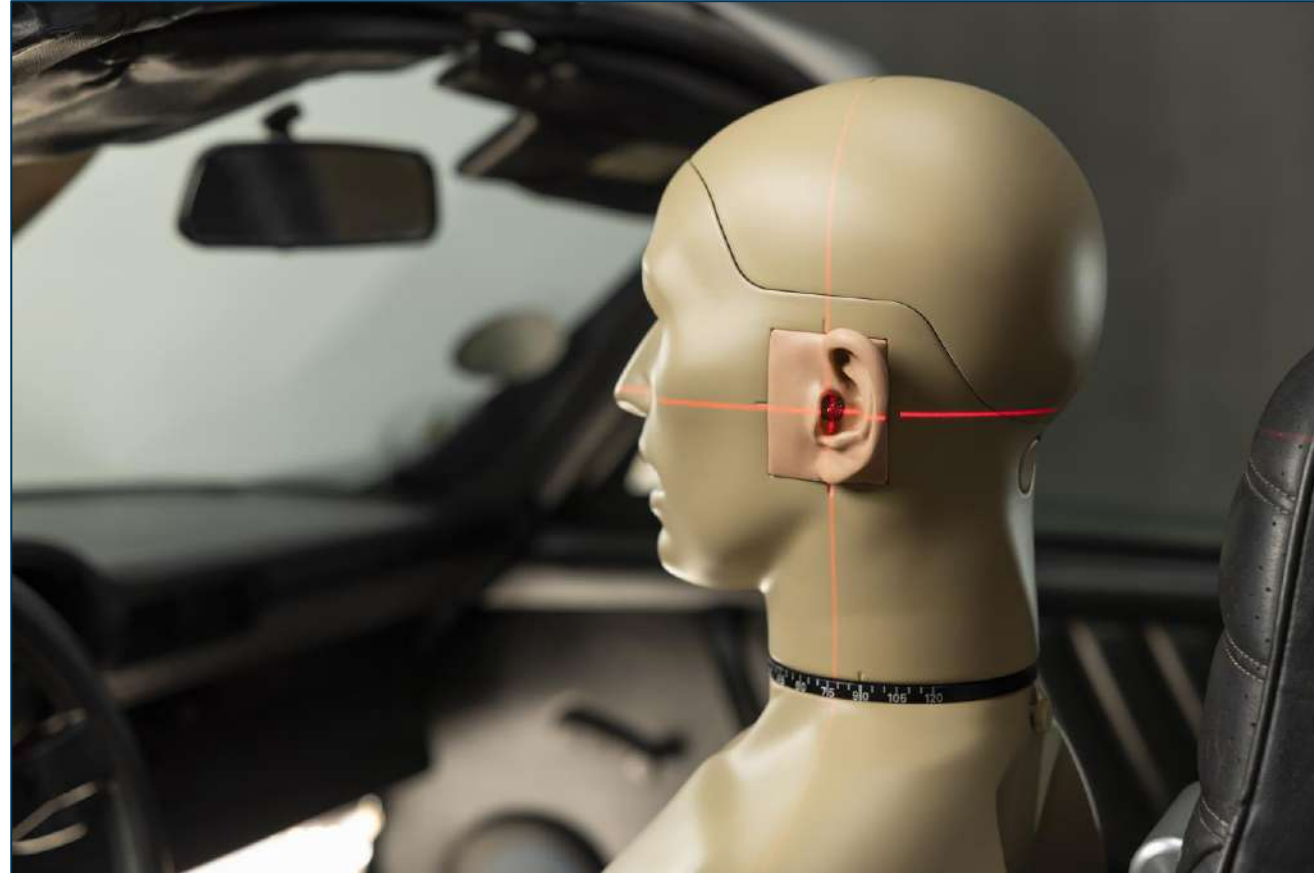


Why Movement Matters?

Why positioning is critical?

- Represents different driver sizes and postures
- Enables realistic listening positions
- Supports unconventional or extreme seating positions
- Allows testing with headrest speakers

AutoKEMAR enables measurements competitors cannot perform

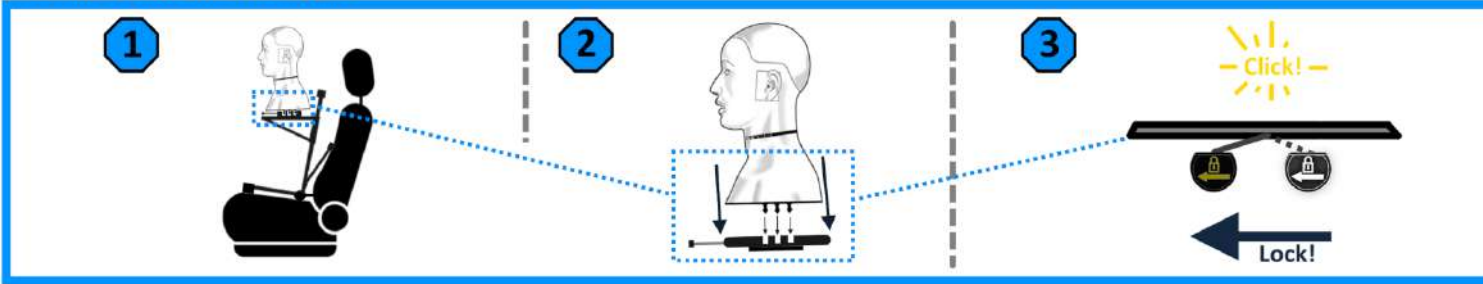


SEAT MOUNT INSTALLATION

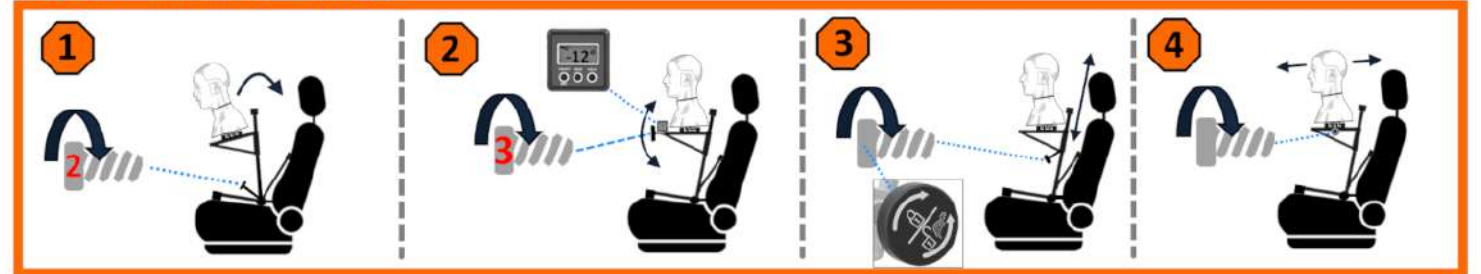


Car Mounting Steps

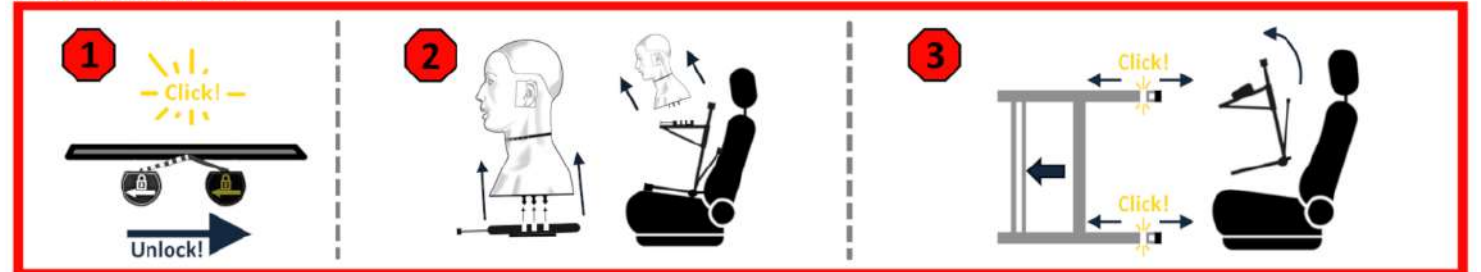
HATS MOUNTING ON SEAT MOUNT



HATS AND SEAT MOUNT ADJUSTMENTS



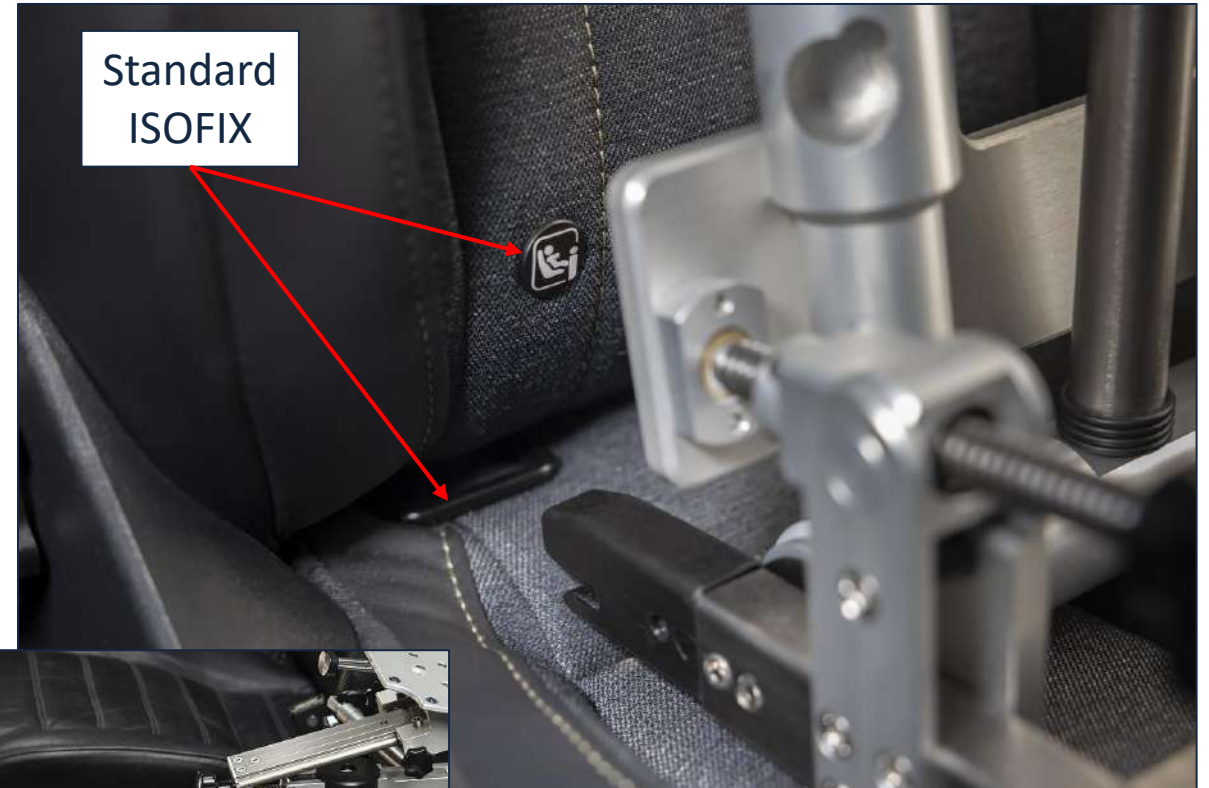
AUTOKEMAR REMOVAL



The ISOFIX

Best way of mounting AutoKEMAR

- Anchor seat mount w/ISOFIX
- Fast and easy
- Provides secure mounting
- Overall stability of the fixture
- ISOFIX release mechanism



The ISOFIX

What if I don't have ISOFIX?

- Not every car has it
- Not every seat has it
- **Option 1:**
Off-the shelf ISOFIX adapters



The ISOFIX

What if I don't have ISOFIX?

- **Option 2:**
GRAS RA0578 Ratchet lashing straps w/ removable telescopic arms (included)

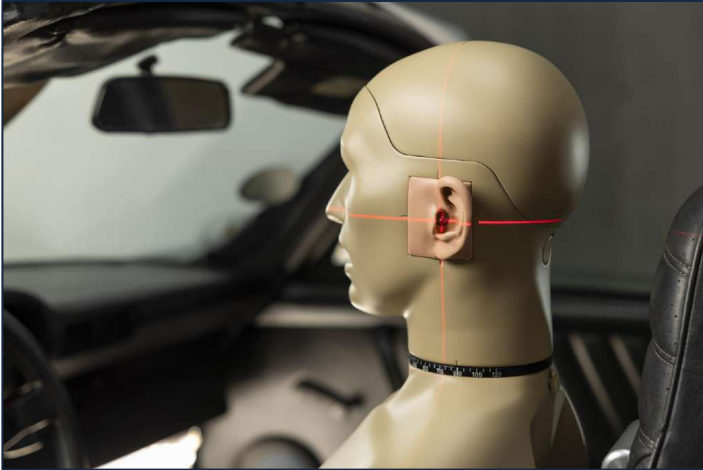
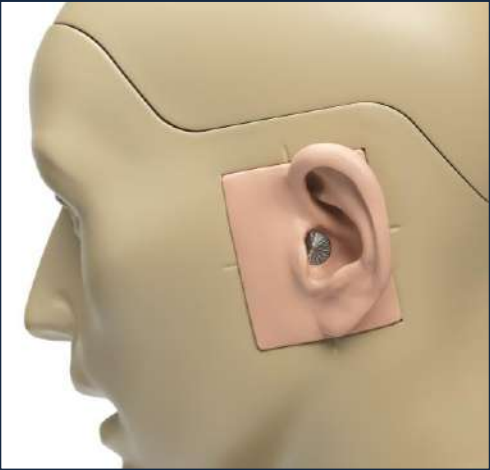


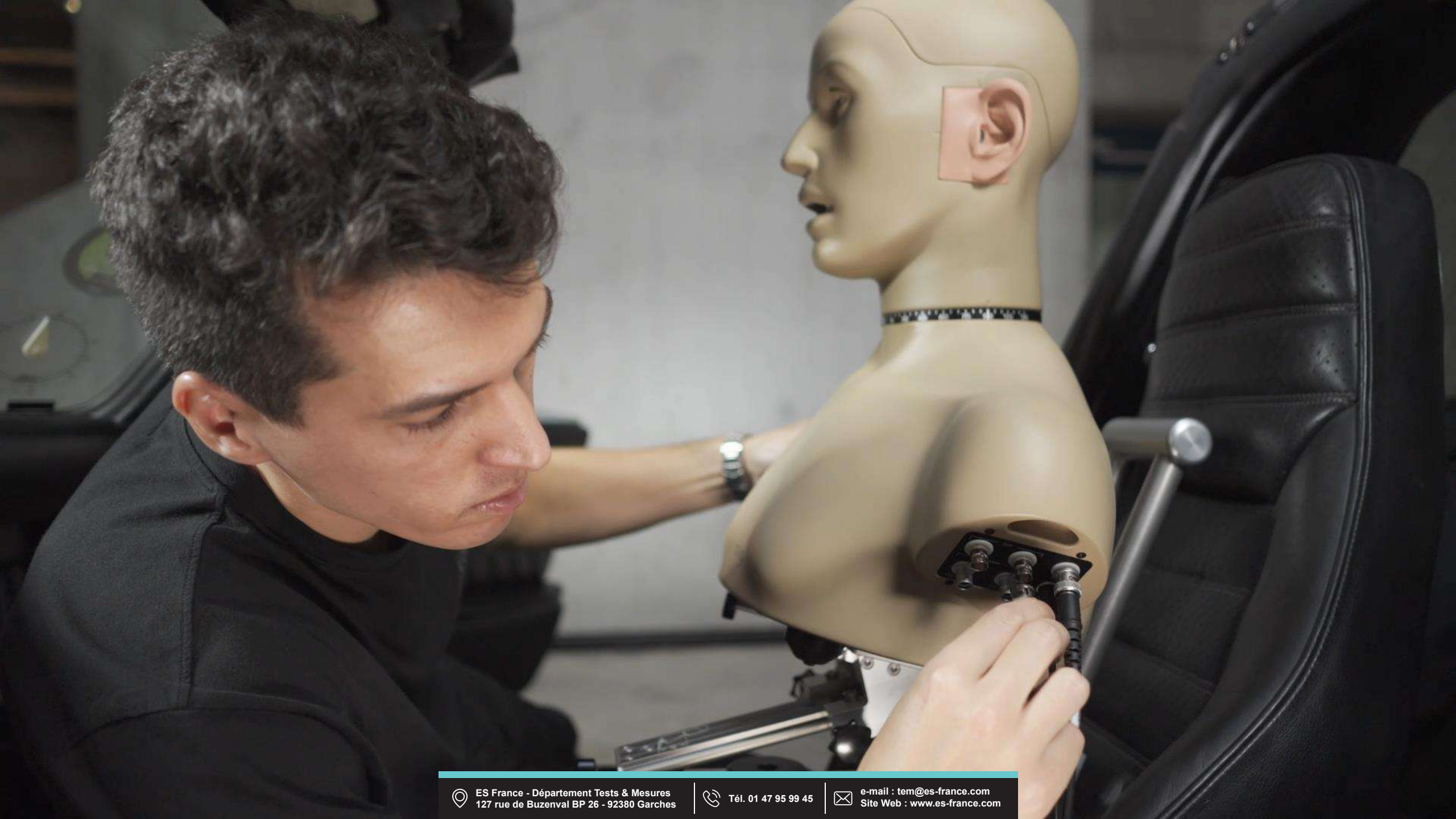
In-Cabin Positioning

Setting the ears in the desired measurement position

- Reference Points
- Laser Measure
- Ear Markings

INCLINOMETER



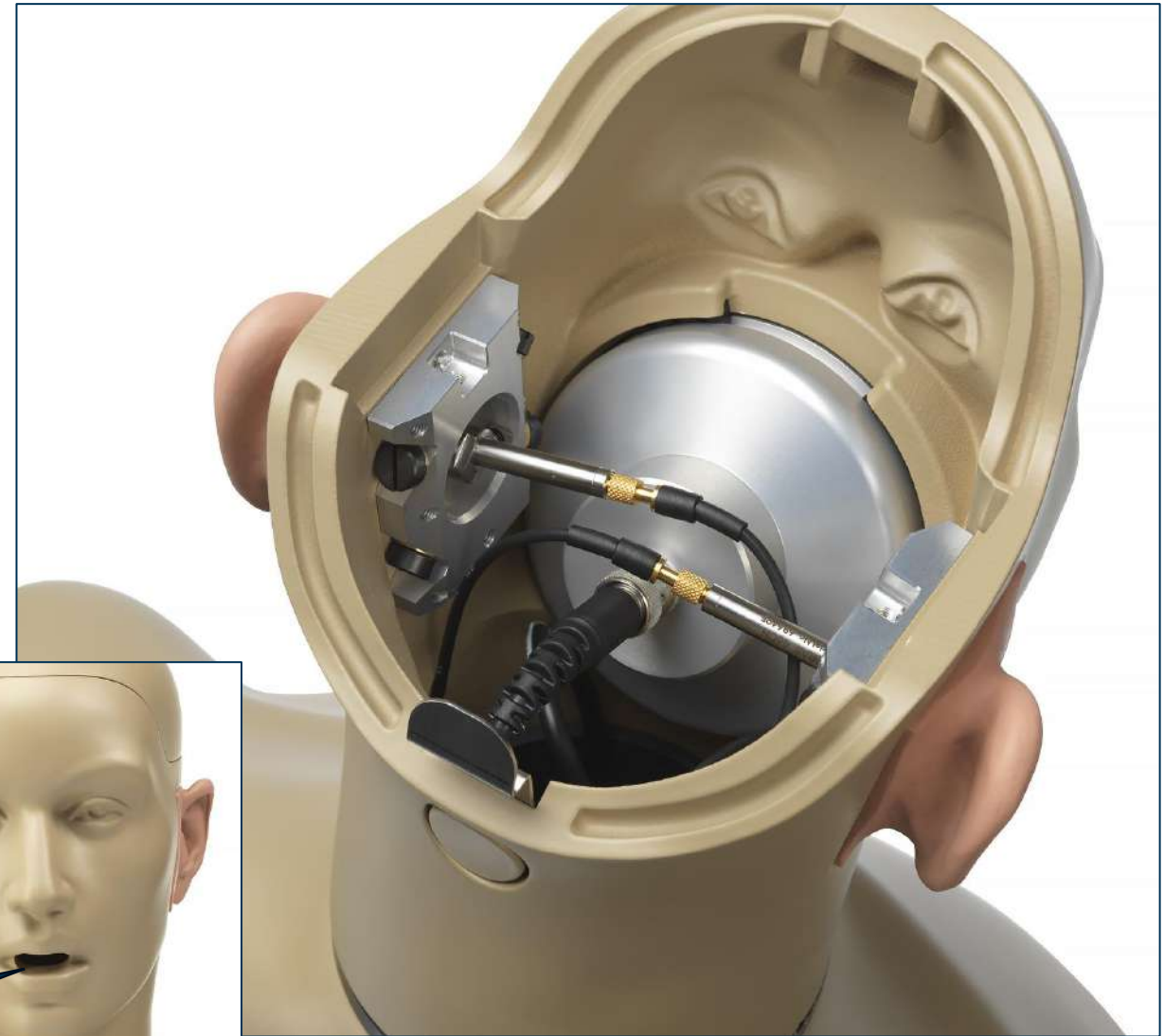




The Mouth Simulator

Integrated mouth simulator option

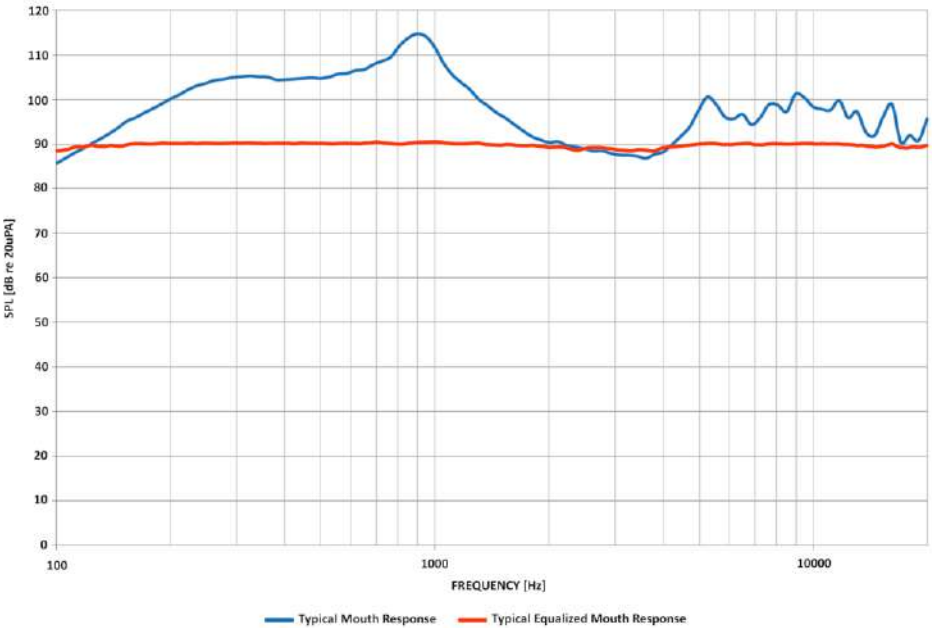
- Enables speech and voice testing
- Supports:
 - Hands-free communication
 - Voice control systems
 - Microphone evaluation
- New design
- Amp in torso



Mouth Simulator Calibration

Equalizing the frequency response

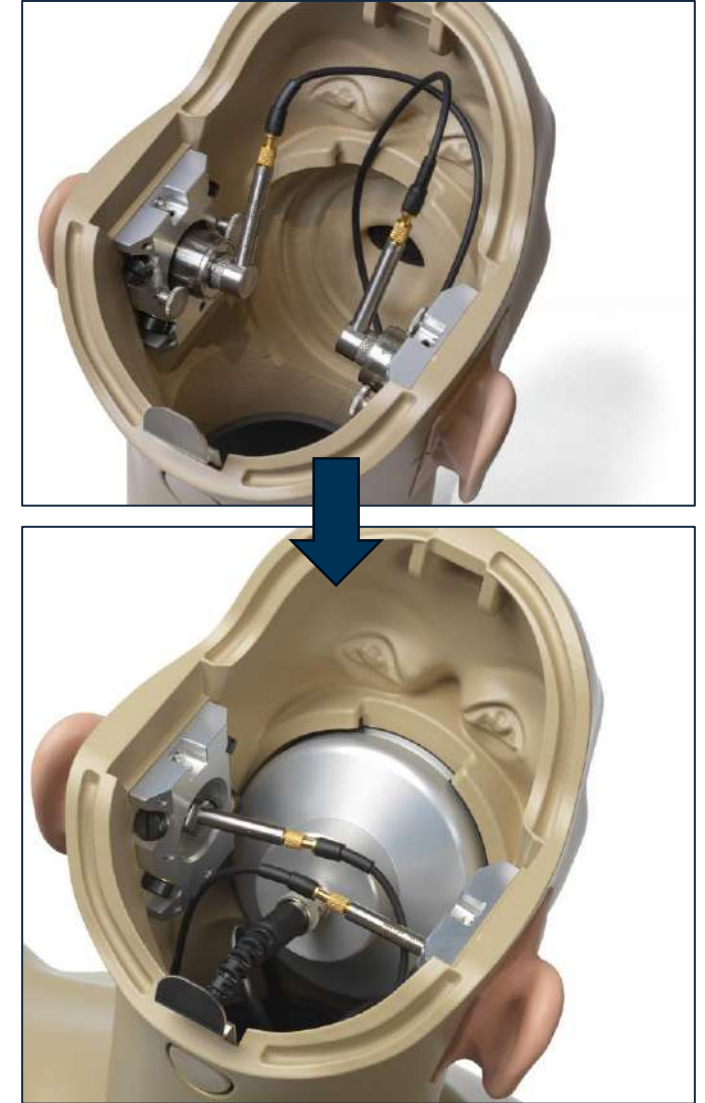
- New mic Holder
- 40PM-1 mic (included)



Mouth Simulator Upgrade

Purchased AutoKEMAR without mouth and now you it?

- Mouth Simulator upgrade available
- Ship AutoKEMAR without mouth to GRAS
- GRAS workshop installs mouth and amplifier
- New calibration
- Mouth calibration accessories added
- Customer receives an upgraded AutoKEMAR with mouth



Modular and Reconfigurable

One AutoKEMAR – Multiple applications

- Interchangeable:
 - Ear simulators
 - Microphones
 - Pinnae types
 - Fast reconfiguration
 - No need to purchase multiple heads
- Future-proof investment for customers



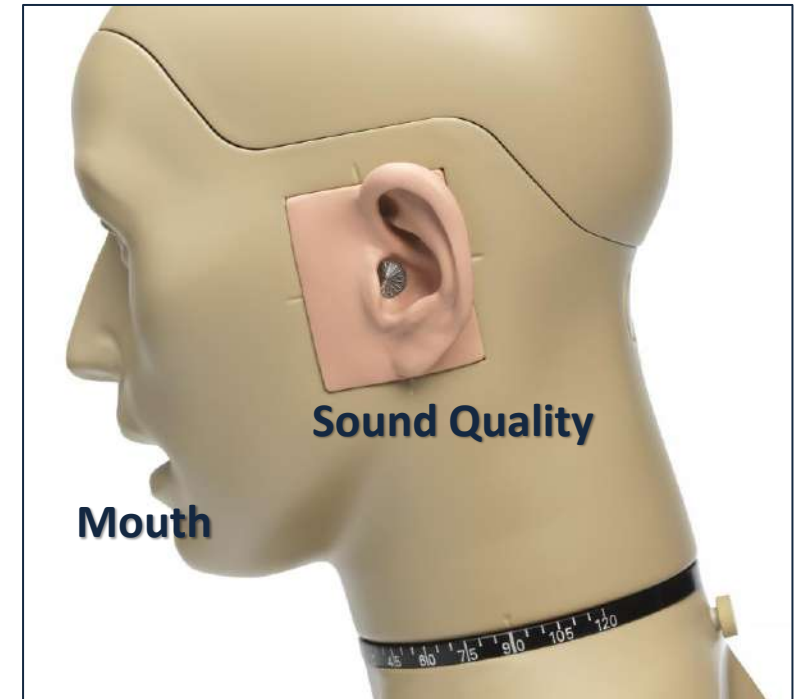
Available Configurations

Initial configurations

- Sound Quality (microphones at ear entrance)
- Low-noise Sound Quality
- High-frequency ear simulators
- With or without mouth simulator



**Ear Simulator w/
realistic ear canal**

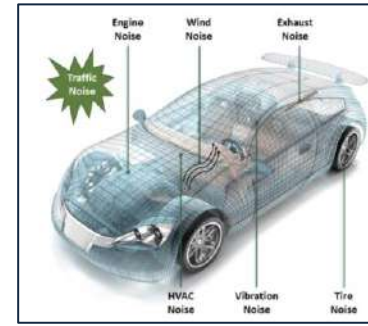


Type	Description
45BD-01	Sound quality, 2-Ch CCP
45BD-02	Sound quality, Low-noise, 2-Ch CCP
45BD-07	Hi-Freq Ear Sims & Anthropometric Pinnae, 2-Ch CCP
45BD-09	Sound quality, 2-Ch CCP (<i>w/ mouth sim</i>)
45BD-10	Sound quality, Low-noise, 2-Ch CCP (<i>w/ mouth sim</i>)
45BD-15	Hi-Freq Ear Sims& Anthropometric Pinnae, 2-Ch CCP (<i>w/ mouth sim</i>)

Typical Applications

Primary use cases

- Audio system performance & tuning
- Sound Quality & Sound Design
- Infotainment and DSP testing
- Speech intelligibility and voice quality
- Hands-free communication
- In-cabin NVH
- Wind tunnel measurements



Equalization Curves

For data analysis

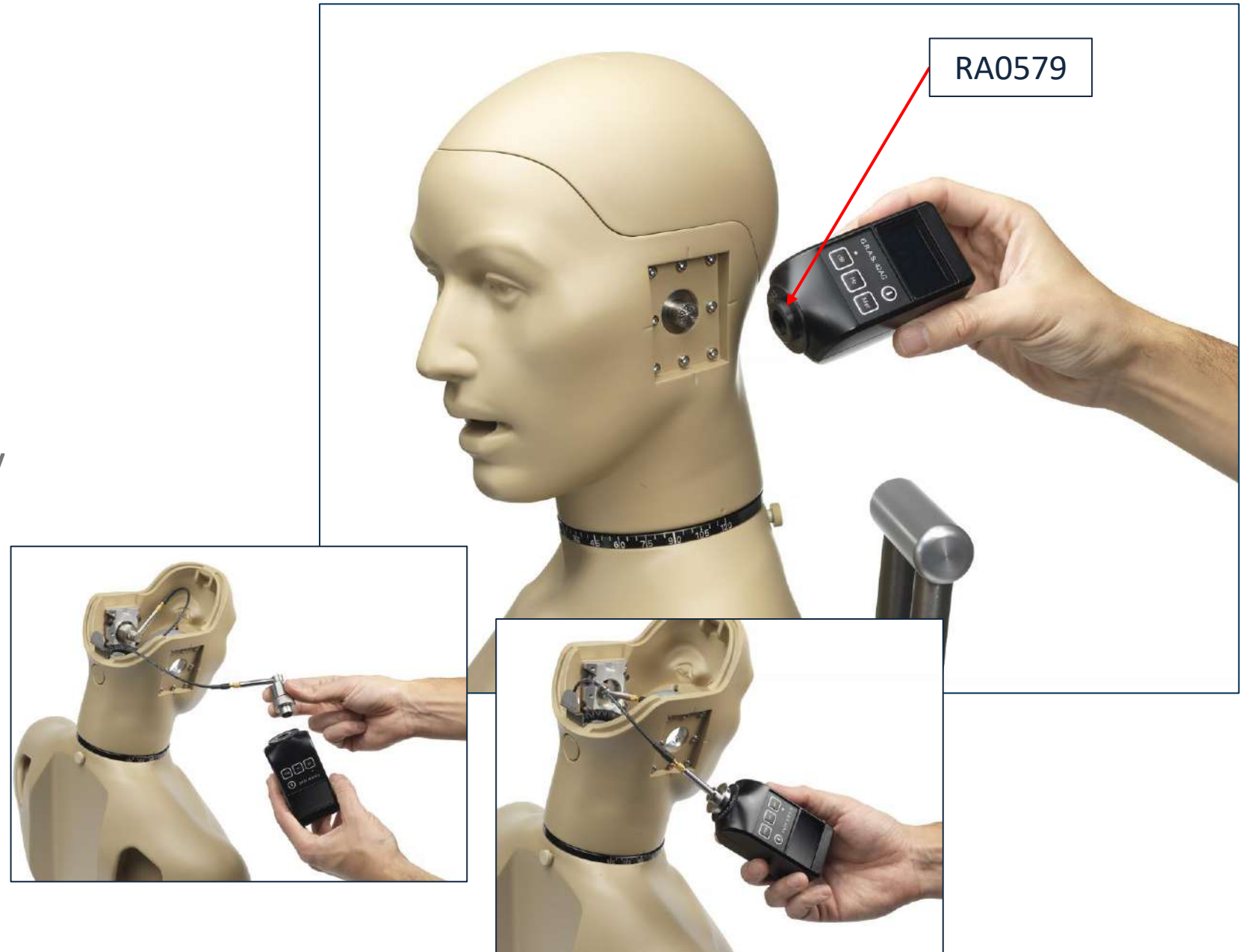
- Make results comparable to:
 - Other HATS configs.
 - Microphone only test
- Diffuse-field
- Free-field
- Direction Independent
 - ✓ Perfect for in-vehicle acoustic test
- HRTF curves also available



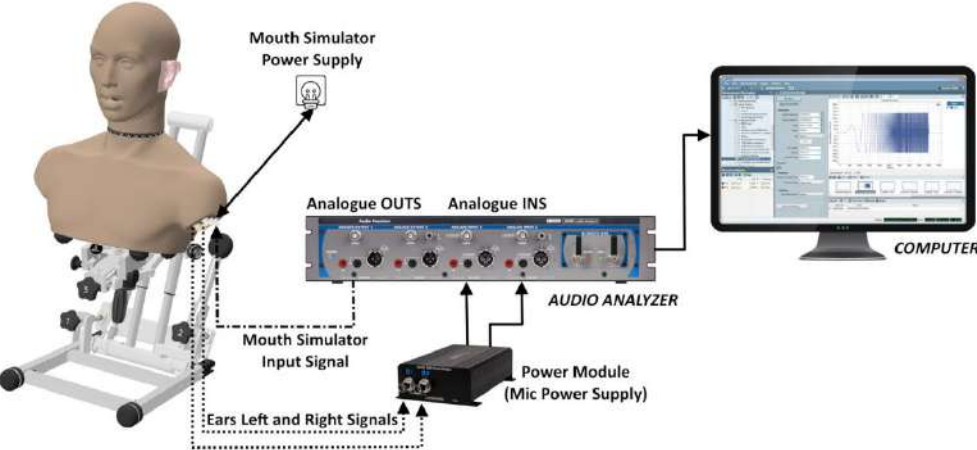
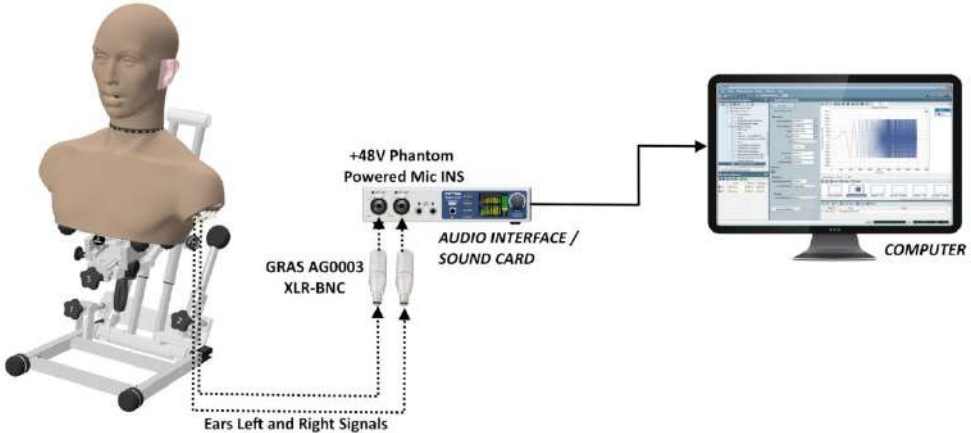
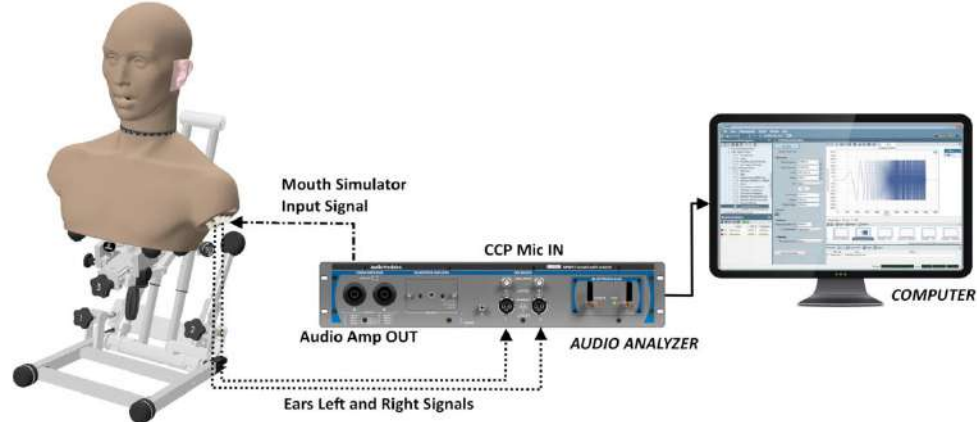
Calibration

Multiple ways

- TEDS
- Inside the head
 - RA0579 cal adapter
 - Only for Sound Quality
- Outside the head



Test Setup Examples



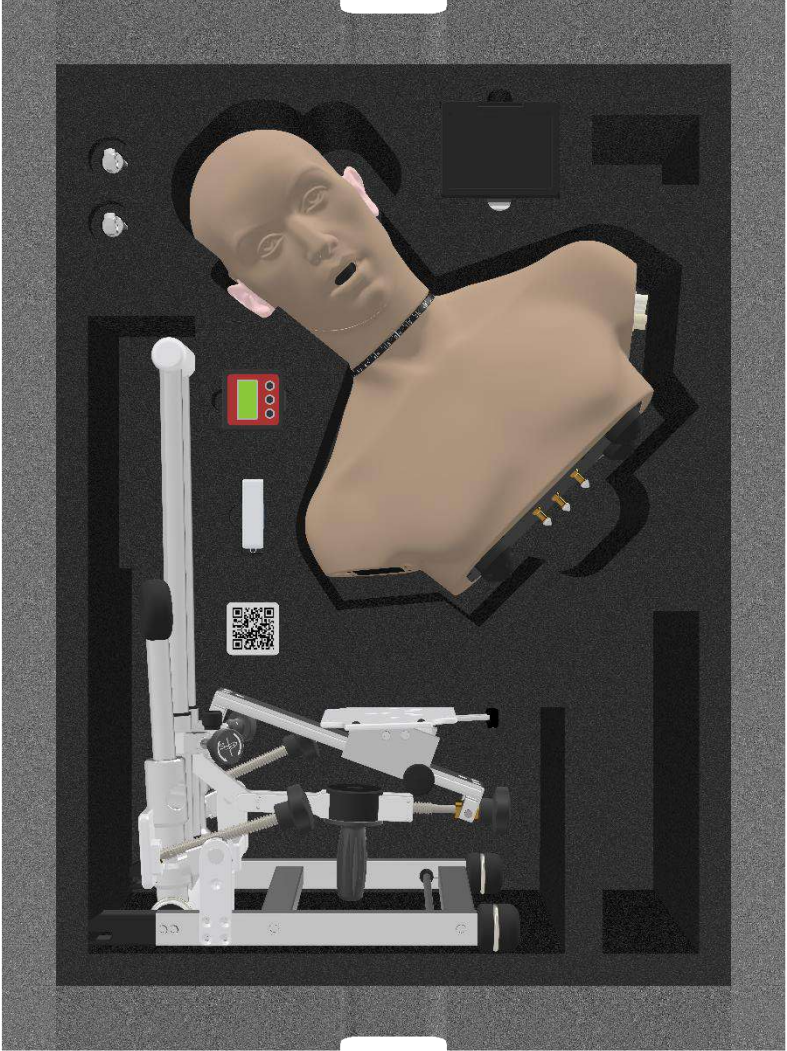
Packaging



Standard



Optional Flight Case
KM0113K



AutoKEMAR vs AutoArray

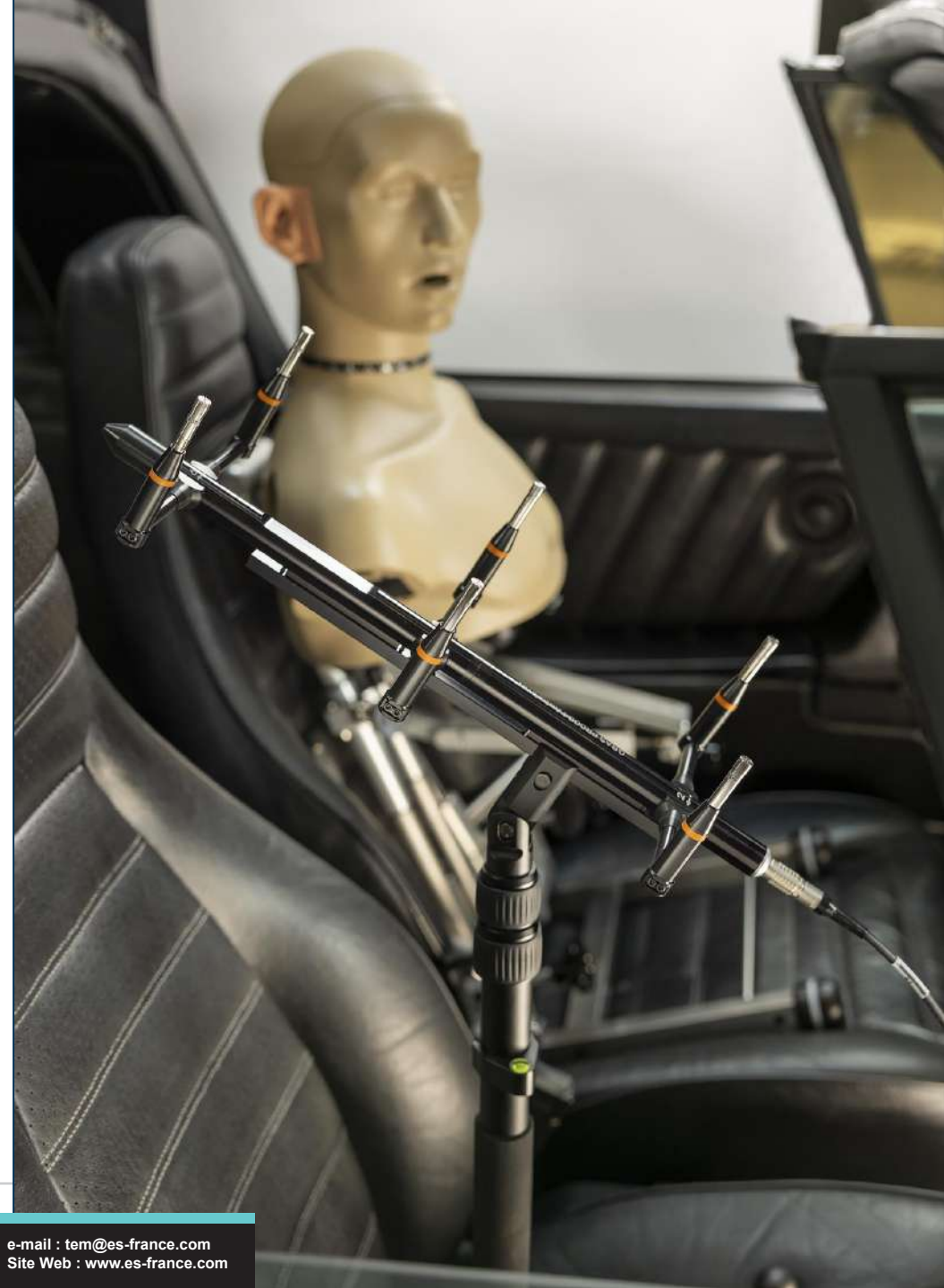
Two complementary tools

AutoArray

- No human body influence
- Faster, repeatable
- Lower cost
- Best for static

AutoKEMAR

- Human body influence
- More realistic
- Supports speech testing
- Lower noise option
- Suitable for dyno and on-road tests

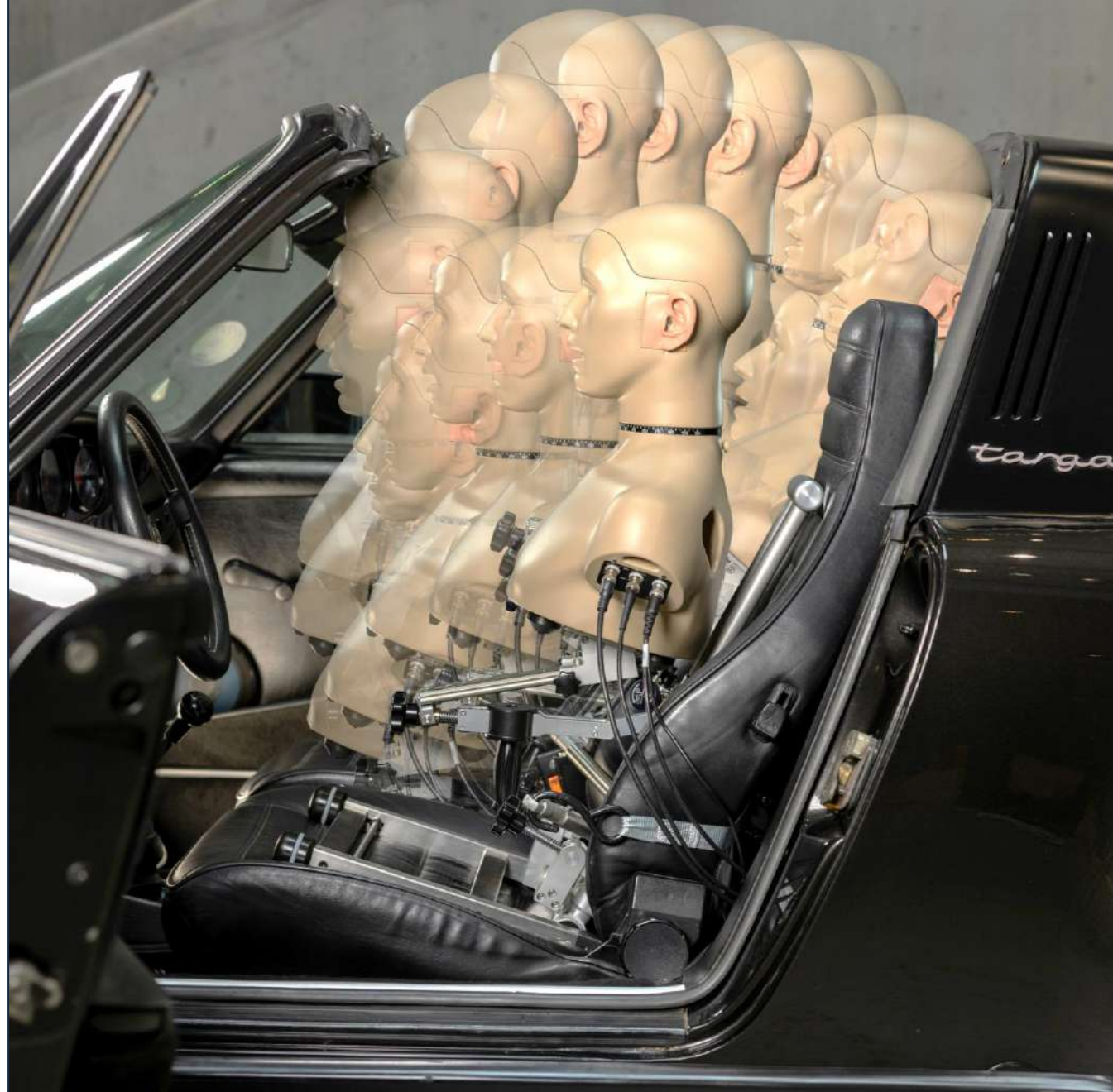




Competitive Advantages

Where AutoKEMAR wins

- Automotive seat mounting
- Much wider movement range
- Human-like shape
- Easy reconfiguration
- Open ecosystem
- Low-noise option
- Mouth simulator upgrade
- Competitive pricing



Key Takeaways

AutoKEMAR in one slide

- GRAS expands automotive solutions
- Best tool for realistic in-cabin testing
- Widest positioning flexibility
- Modular and future-proof
- Strong complement to AutoArray

