

Legal Admissibility Mapping (Daubert Section)

SANTOS™ Human Capability Analysis System

Purpose

This section maps the SANTOS™ methodology to the **Daubert standard for admissibility of scientific evidence**. It demonstrates that SANTOS meets the key criteria used by courts to determine whether expert testimony is **reliable, relevant, and scientifically valid**.

Daubert Mapping Table

Daubert Factor	SANTOS™ Response	Supporting Basis	Legal Interpretation
1. Testability	Yes — SANTOS predictions can be tested against real human motion and task performance	Motion capture validation studies; posture prediction validation; experimental comparisons of predicted vs. measured human motion	The methodology is falsifiable and testable , satisfying a core scientific requirement
2. Peer Review & Publication	Yes — Extensive peer-reviewed literature over multiple decades	Publications in biomechanics, human modeling, optimization, and simulation; books and journal articles by Karim Abdel-Malek and collaborators	Demonstrates that methods have been scrutinized and validated by the scientific community
3. Known or Potential Error Rate	Yes — Accuracy quantified using statistical measures	Reported R ² values, regression analysis, confidence intervals; validation against experimental data	Shows quantifiable and bounded accuracy , not subjective estimation
4. Standards Controlling the Technique	Yes — Based on established scientific and engineering standards	Newtonian mechanics, biomechanics, rigid body dynamics, optimization theory; standard anthropometric data	Confirms the method follows recognized scientific frameworks and constraints
5. General Acceptance	Yes — Core methods widely accepted in biomechanics and engineering	Predictive dynamics, motion simulation, ergonomic modeling are standard in academia and industry	Establishes that the underlying science is not novel or fringe
6. Reproducibility	Yes — Deterministic model produces consistent results	Same inputs yield identical outputs; methods fully documented and transparent	Supports independent verification and repeatability
7. Transparency / Non-Black-Box	Yes — Inputs, assumptions, and processes are explicitly defined	Documented modeling pipeline; known inputs (forces, geometry, constraints)	Counters claims of opacity; ensures method can be examined and challenged
8. Fit to the Case (Relevance)	Yes — Directly addresses human capability questions	Applicable to slips, falls, lifting, fatigue, motion feasibility, and injury scenarios	Provides direct assistance to trier of fact in determining key issues
9. Alternative Explanations Considered	Yes — Multiple scenarios can be simulated and compared	Ability to vary conditions (speed, friction, posture, load) and evaluate outcomes	Demonstrates robustness and completeness of analysis
10. Independent Validation	Yes — Validated across tasks, populations, and experimental setups	Validation studies across anthropometry, task types, and environments	Shows method is not case-specific or tailored to outcome

Summary Statement

SANTOS™ satisfies all major Daubert criteria for admissibility:

- It is **testable and has been tested** through experimental validation
- It is **supported by peer-reviewed scientific literature**
- It has **known and quantifiable accuracy and uncertainty bounds**
- It is grounded in **widely accepted scientific principles**

- It produces **reproducible and transparent results**
- It is **directly relevant to the factual questions at issue in litigation**

Key Takeaway

SANTOS is not a speculative or subjective tool. It is a **physics-based, experimentally validated, and peer-reviewed scientific methodology** that meets the standards required for reliable expert evidence in court.