Ergonomics and User Experience Study in Real-World Practice

A summary of results from a study evaluating ease of use, patient and equipment accessibility, and overall user satisfaction with the Allia™ Moveo imaging platform.

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Over the past decade, interventional procedures have become increasingly diverse and complex, with health care staffing challenges continuing to increase, driving the need for versatile, easy-to-use interventional labs centered on clinician and patient experience, ergonomics, care efficiency, high-quality imaging, and simplified procedural workflows. Radiation exposure remains an important concern for staff,[1-7] while musculoskeletal disorders continue to affect a large proportion of interventionalists, largely due to prolonged use of protective equipment and ergonomically challenging working environments.[8-10]

Allia™ Moveo (GE HealthCare) (Figure 1) was developed within this context as a new-generation interventional imaging platform combining high-quality, two- and three-dimensional imaging capabilities with a user-centered and mobility-focused design to improve ease of use and operator comfort, enhance room flexibility, facilitate patient access, and support efficient procedural workflows and multidisciplinary interactions across a broad range of interventional applications.

The successful integration of technologic innovations into routine clinical workflows is as essential as technical performance. The objective of this ergonomics and user experience study was therefore to evaluate the Allia Moveo platform in a real-world clinical environment prior to its commercialization and assess its impact on ease of use, patient and equipment accessibility, and overall user satisfaction among members of a multidisciplinary interventional care team.

MATERIALS AND METHODS

This prospective study was conducted at a single center equipped with multivendor interventional labs. User feedback was collected over two 3-month periods: on system 1 (Discovery™ IGS 7, GE HealthCare) before it was replaced, from July to October 2025, and on system 2 (Allia Moveo) following its installation and staff training, from November 2025 to February 2026. The two interventional systems were successively evaluated in the same physical room and surrounding environment by the same multidisciplinary clinical team for the same types of procedures.



Figure 1. Allia Moveo interventional lab.

Throughout the study period, a broad spectrum of interventional procedures ranging from routine to highly complex interventions were performed in the lab, including vascular procedures (standard and complex aortic repairs; endoleak embolization; angioplasty and stenting procedures in the visceral, renal, carotid, or peripheral arteries) and structural heart interventions (transcatheter mitral valve repair [MitraClip™, Abbott Vascular], transcatheter aortic valve replacement, transcatheter tricuspid valve repair [TriClip™, Abbott Vascular], and left atrial appendage closure).

Participants in the study included health care professionals with varying levels of experience in interventional practice, working in the lab on a daily, regular or occasional basis, with experience using other interven-

tional systems. The study population represented the full range of clinical roles involved in patient management during interventional procedures and was divided into five user groups: vascular surgeons, interventional cardiologists, nurses and technologists, anesthetists, and echocardiographers.

User feedback was collected using structured questionnaires tailored to participants' specific roles across the following key topics: user comfort, patient access, overall clinical performance, and user experience. Responses were recorded using a 5-point Likert scale, with scores ranging from 1 (lowest level of agreement) to 5 (highest level of agreement).

The primary endpoint was the comparison of user experience between systems 1 and 2, assessed by mean Likert scores and the proportion of favorable ratings (scores of 4 or 5). Secondary endpoints included the score distributions and overall descriptive comparisons across systems.

For each question, scores for the two systems were compared using ordinary least squares (OLS) regression with participant-clustered robust SEs and Benjamini–Hochberg correction for multiple testing. For each topic, participant-level scores were averaged across corresponding questions and compared between the two systems using OLS regression with participant-clustered robust SEs. Because only one echocardiographer participated in the study, inferential statistics associated with this user were not computed, and results are reported descriptively as observed differences between systems. Statistical analyses were performed using Python (version 3.12, Python Software Foundation).

RESULTS

A total of 82 participants completed the questionnaire one to four times, of whom 22 participants evaluated both systems. During the first 3-month period, 50 participants evaluated system 1, yielding 96 questionnaires. During the second 3-month period, 51 participants evaluated system 2 by completing 62 questionnaires.

Figure 2 shows a comparison of the Likert scores obtained for the two systems for each key topic. Mean ratings significantly increased with Allia Moveo across all key topics for all users: user comfort (from 3.3 ± 1.1 to 4.6 ± 0.6), patient access (from 3.6 ± 1.0 to 4.6 ± 0.7), overall clinical performance (from 3.9 ± 0.8 to 4.5 ± 0.6), and user experience (from 3.6 ± 1.0 to 4.5 ± 0.7) ($P < .05$).

Based on the proportion of favorable ratings (score of 4 and 5), Allia Moveo was associated with a comfortable working environment in 94% of cases (vs 39% on Discovery IGS 7), easy access to patients in 92% of cases (vs 53% on Discovery IGS 7), strong performances

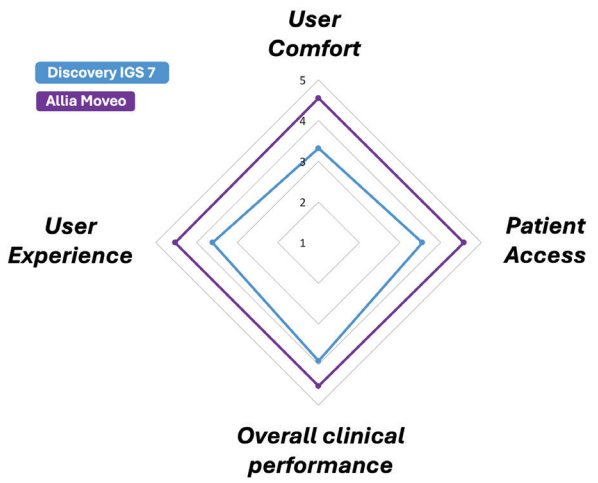


Figure 2. Overall user assessment of Discovery IGS 7 and Allia Moveo by key topic. Radar plots display mean Likert scores averaged across participants for Discovery IGS 7 (blue) and Allia Moveo (purple) for each key topic. Differences between systems were statistically significant for all key topics ($P < .05$). Scores range from 1 (strong disagreement) to 5 (strong agreement).

for clinical care in 92% of cases (vs 77% on Discovery IGS 7), and an optimal user experience in 86% of cases (vs 55% on Discovery IGS 7). Overall, 81% of operators preferred working in the Allia Moveo lab over other labs within the department.

Figure 3 shows a comparison of the Likert scores obtained for the two systems for each user group. Across all user groups, Allia Moveo demonstrated higher average ratings for all questions, with increases of up to +2.1 points on the 5-point Likert scale. Specifically, vascular surgeons and interventional cardiologists reported improved access to patients and controls with Allia Moveo compared to Discovery IGS 7 (96% vs 62% of cases with scores 4 and 5), as well as increased user autonomy and comfort (100% vs 58% of cases with scores 4 and 5), thanks to the detector controls enabling clinicians to independently move the table and the imaging system on Allia Moveo (Figure 4). In 78% of cases, clinicians found Allia Moveo very easy to use (score 5) compared with 29% for Discovery IGS 7. Lab reconfiguration to address each procedure's needs was simpler and quicker with Allia Moveo, with score 5 given in 65% of cases on Allia Moveo versus 15% on Discovery IGS 7. In 87% of cases, clinicians preferred working in the Allia Moveo lab compared to any other lab in the department.

Nurses and technologists reported improved team communication and coordination for Allia Moveo as

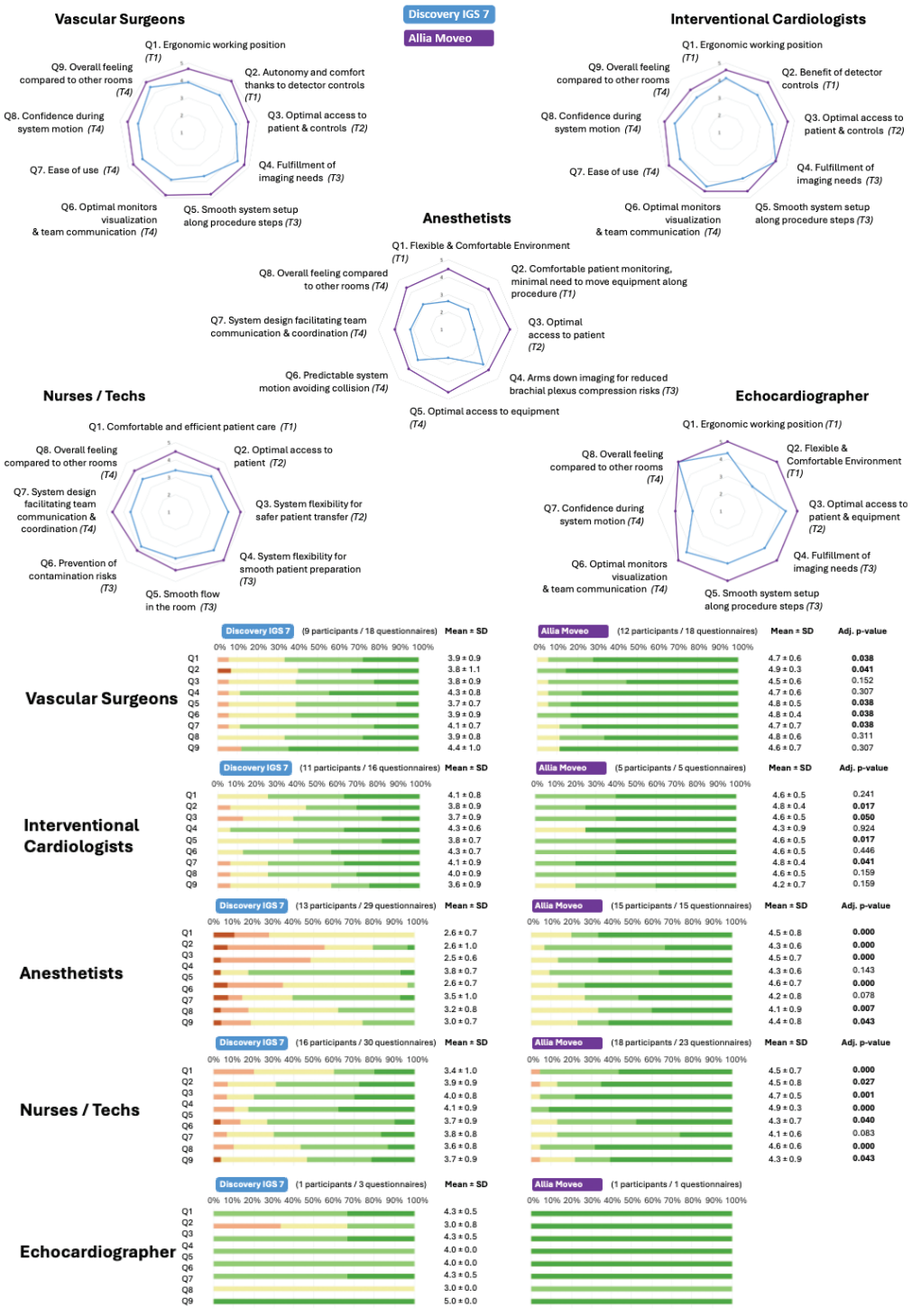


Figure 3. User evaluation of Discovery IGS 7 and Allia Moveo across interventional team members. Radar plots display mean Likert scores averaged across participants for Discovery IGS 7 (blue) and Allia Moveo (purple) for each questionnaire statement. Scores range from 1 (strong disagreement) to 5 (strong agreement). T labels refer to the key topics: T1, user comfort; T2, patient access; T3, overall clinical performance; T4, user experience. Stacked bar charts display the distribution of the Likert scores as percentages of total responses, from dark red representing score 1 (strong disagreement) to dark green representing score 5 (strong agreement).

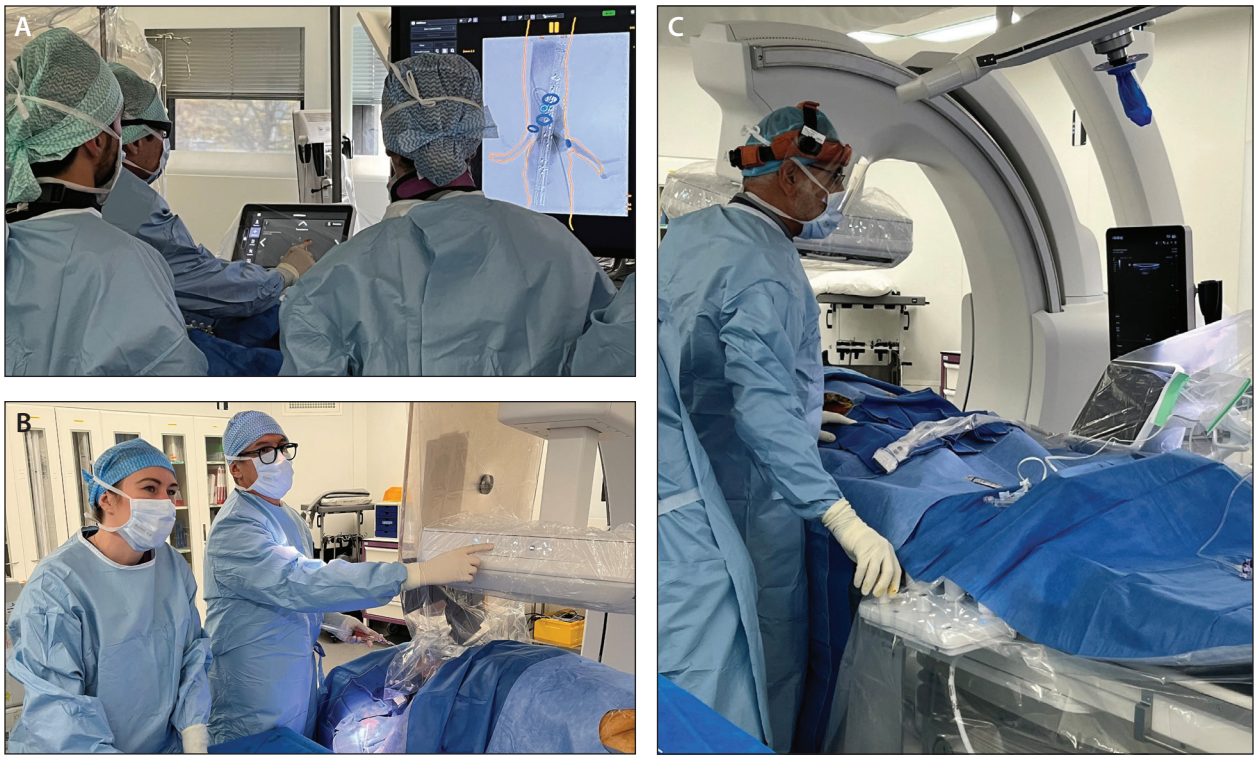


Figure 4. Easy-to-access controls improving user experience and operators' comfort. Designed around user comfort and efficiency, Allia Moveo combines intuitive controls, seamless mobility, and easy access to key interfaces to support confident, ergonomic workflow throughout every procedure. Allia Moveo provides a user profile–based Touch Panel to adapt to each user's preferences, offering a personalized interface that makes setup faster and easier (A). With detector controls, Allia Moveo lets users adjust positioning without stretching, improving ergonomics and overall user comfort. The Allia Moveo thin, minimal-footprint detector column keeps sightlines clear, making communication easier across the care team (B). With compact Control Panel and flexible access to the Touch Panel, Allia Moveo reduces user movement and supports a more relaxed, ergonomic workflow (C).

compared with Discovery IGS 7 (95% vs 57%, respectively, with scores of 4 and 5) and strongly agreed (score 5) that the positioning flexibility of Allia Moveo's design facilitated patient installation, preparation, communication, patient care throughout the procedure, and transfer of sedated patients (75% of cases for Allia Moveo vs 29% on Discovery IGS 7) (Figure 5). In 78% of cases, nurses and technologists preferred working in the Allia Moveo lab compared to any other lab in the department.

Among anesthetists, access to patients and equipment improved markedly with Allia Moveo, with 87% of cases receiving scores of 4 or 5, compared with 2% on the Discovery IGS 7. These differences were observed despite both systems being evaluated in the same room and within an otherwise unchanged equipment environment. Similarly, improvements in patient monitoring and team communication were also reported (93% vs 20% and 67% vs 38% of cases receiving scores of 4 or 5, respectively). In 77% of cases, anesthetists preferred working in the Allia Moveo lab compared to any other lab in the department.

The key design features contributing to these improvements are illustrated in Figures 4 to 6, including easy-to-access controls that support autonomous system positioning, a mobile gantry architecture that improves patient accessibility and lab versatility, and artificial intelligence (AI)–based cone-beam CT (CBCT) reconstruction with CleaRecon DL (GE HealthCare), which has been associated with improved CBCT image quality and diagnostic confidence in previously reported studies.[11-14]

KEY FINDINGS AND PERSPECTIVES

In this prospective clinical evaluation, Allia Moveo was associated with significantly improved ratings for user comfort, accessibility to patient and equipment, clinical performance, and overall user experience compared with the previous-generation interventional platform, despite both systems being evaluated in the same room



Figure 5. Optimized patient access. Allia Moveo facilitates patient access and procedural flexibility through its cable-free, compact, and highly mobile gantry, creating a workspace that adapts to clinical needs. SmartMove provides perioperative access to the patient, creating space to circulate freely on either the left or right side, enhancing comfort and workflow efficiency.

and surrounding equipment, under comparable clinical conditions, and despite generally positive baseline clinical team satisfaction with the previous-generation system. The benefits were consistently observed across multiple user groups, highlighting the importance of considering the needs of the entire procedural team when designing and evaluating imaging systems.

This study has potential limitations. As a single-center evaluation, its findings may not be fully generalizable to other institutions or procedural settings. However, the broad range of procedures and health care professionals involved, all of which remained consistent across both evaluation periods, provides a representative assessment of a real-world multidisciplinary interventional practice.

Although a substantial number of health care professionals participated overall, the sample size within some user groups remained limited. In particular, the number of interventional cardiologists who evaluated Allia Moveo during the post-installation period was relatively small, which may have limited the statistical power of the analysis. Nevertheless, the overall trend was consistent across user groups and questions, supporting the robustness of the findings.



Figure 6. Enhanced performance for clinical care. Allia Moveo incorporates an open wide-bore C-arm, making CBCT adoption seamless in routine practice and enabling its use across a broad range of procedures (A). Comparison of conventional CBCT reconstruction (B) and AI-based CleaRecon DL reconstruction (C) after endovascular aortic repair.

Finally, the evaluation relied on subjective user feedback. Although subjective assessments may be influenced by user expectations and individual preferences and do not directly quantify operational performance and clinical benefits, user experience remains an important factor of staff well-being, workplace satisfaction, and long-term clinical adoption. Although subjective, both evaluations were conducted using the same structured questionnaires, within the same clinical environment, with identical room configuration, procedural mix, clinical team, and practice. This design minimizes potential confounding factors and allows a more direct assessment of the impact of the platform design itself. Further evaluation could be conducted with objective metrics, including procedure duration, patient setup time, radiation exposure, staff movements within the room, or measures of physical workload and musculoskeletal strain.

Beyond imaging performance alone, the findings of this study suggest that user-centered design plays an important role in facilitating clinical workflows and improving working conditions and staff experience within complex interventional environments. ■

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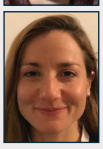
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Any statements or results described here were achieved in Hôpital Marie Lannelongue unique setting. Since there is no "typical" hospital and many variables exist, i.e. hospital size, case mix, etc., there can be no guarantee that other customers will achieve the same results or draw the same conclusions.