

Highly maneuverable radiation protection for interventional radiology

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🌐 VU Reference:
VU23132

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Summary

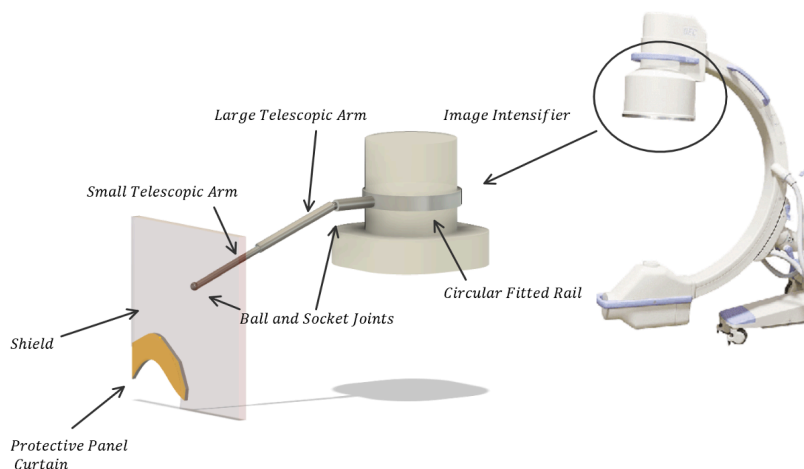
An interdisciplinary team of Vanderbilt doctors and engineers has designed a more user-friendly mounting system for radiation protection shields that maintains a high level of protection from hazardous scattered radiation without impeding the workflow of interventional radiologists.

Addressed Need

Scattered ionizing radiation poses a significant occupational hazard to interventional radiologists. While lead acrylic barriers are essential for reducing exposure to scattered radiation during procedures, the existing mounting systems for these shields are cumbersome to maneuver and can create unnecessary delays or unpredictable workflows, causing providers to often avoid using them altogether due to the poor maneuverability. There is a significant gap in the market for mounting systems that maintain a high level of radiation protection while not adding to or interfering with procedures.

TECHNOLOGY DESCRIPTION

To address this challenge, a team of Vanderbilt students worked with VUMC interventional radiologists to develop a mounting system that **integrates seamlessly** into the procedural suite. This new system mounts onto the image intensifier of the fluoroscopy machine and is readily adjustable with a telescoping arm and precisely maneuverable joints. By using existing lead shields or drapes, the design maintains a high level of radiation protection while being **simple, sterilizable, and cost-effective**.



A virtual prototype of the user-friendly shield mount system that attaches around the fluoroscopy machine's image intensifier for seamless integration. The unique 2-arm telescoping system is designed to avoid "kinking" of the arms that may limit positioning abilities and potentially clash with surrounding equipment in the crowded procedural room. The upper arm of the shield is attached to the image intensifier using a smooth rail system to allow for quick and precisely tunable shield movement.

Competitive Advantages

Existing mounting systems that use mobile carts or attach to the ceiling have poor maneuverability in the crowded procedure room, and they can even clash with key equipment like lights or monitors. By mounting directly to the fluoroscopy machine, this system is designed to be both **ergonomic and easily maneuverable** so as not to interfere with existing equipment or the procedural workflow. Its **unique 2-arm telescoping design** allows for the shield to navigate without disruption based on specific procedural needs — even during scans where the fluoroscopy machine rotates 360 degrees around the patient. The mount was designed to decrease shield adjustment time from **2 minutes to under 30 seconds** to limit workflow delays. Hospital systems can utilize this mount with existing shields and drapes to be cost-effective while improving the safety of providers and patients.

Intellectual Property Status:

Patents: A provisional patent application has been filed.

Stage of Development:

The inventors have created a computer design and are now developing a proof-of-concept prototype.