

Korea-Singapore R&D JOINT CALL

Pre-proposal Application Form

Title	Development of imaging equipment for ophthalmology disease screening
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Brief Description of Proposed Collaboration

1. Research Aims

- Development of main components module for ophthalmic surgical procedures
 - Development and verification of motorized C-arm system in application
 - Design of X-ray Cell module circuit and module pack production to match the shooting conditions
 - Design of system gantry and equipment through the confirm of module specification
- Development of movement driving mechanism in multi-functional structure
 - Implementation of Detachable X-ray source to detector through the C-arc structure design
 - Implementation of rotating movement through the C-arc design of the support structure axis to motorized driving and isocentric rotating movement (tomosynthesis shooting modes)
 - Building of support frame of C-arc in robotic arm

2. Research Need & Problem

- There are great necessity to motorized fluoroscopy for ophthalmic surgical procedures in cadabar dissection including orbital inside wall, large inferior orbital wall contain fracture boundary, and defect of the posterior wall
 - Establishment of geometrical and morphological index
 - For this purpose, orbital implants have been decided by 3 dimensional simulation through computed tomography (CT) .
 - There have been required to real-time 3-dimensional tracking of orbital impants during the ophthalmic surgical procedures.
 - Conventional surgical fluoroscopy have been a barrier to the development of ophthalmic surgical fluoroscopy because their size were not appropriate for ophthalmic surgical procedures.
- In recent years, flat panel x-ray detector equipped with fluoroscopy have take a large portion of domestic and international market.
 - There are need to a new solution for breakthrough the current market by high performance and customized fluoroscopy due to their competitiveness.
 - There are necessity of precise fluoroscopy in the filed of ophthalmic surgical procedures in which size and function.

3. Solution Overview

- Enabling of 3 dimensional fluoroscopy shooting and using by the minimization and refinement of detector, generator(tube), main frame.
 - Development of C-arc high-precision rotation by weight lightening of main components.
 - General fluoroscopy usage in general surgical procedures by automatic and manual rotation
 - 3 dimensional tomosynthesis by the motorized rotating of C-arc.
 - 2D/3D image viewer and managing software
- 3 dimensional scanning and surgical simulation to the specified ophthalmic surgical procedures
 - Multi-functional mobile x-ray fluoroscopy to the surgical procedure of eye trauma, orbital wall fracture, ocular injury, optic nerve damage, etc.
 - Weight lightening tomosynthesis with rapid 3D facial shooting

4. Solution Impact

- Portable precision and motorized C-arm used surgery could be extend in their application such like diagnosis , treatment, rehabilitation, etc.
 - Make a technical barrier and best solution by the acquisition of core technology in motorized C-arm in ophthalmic surgical procedures.
 - Export growth and import substitution by the development of motorized C-arm in ophthalmic surgical procedures.
- Motorized C-arm is a state-of-the-art technology
 - There could be make a great job creation effects by similar equipments application suchlike CT, Angio field.
 - Angiographic imaging equipment markets are enlarging in recently and it means similar ophthalmic market could be expanded.

5. Collaborative Planning

- We need a collaboration of research institute of A*STAR in Singapore
 - Institute of High Performance Computing (IHPC) could be a good collaboration partner in development of motorized C-arm.
 - Engineering Mechanics (EM) departments of IHPC could give a good solution about a development of motorized C-arm.
- We will try a contact to IHPC to collaborate a development of motorized C-arm.
 - If there are need, we will conduct a research meeting with the team member of EM in IHPC
 - Our researchers will be stayed during the project and invite the A*STAR researcher.