



# REAL-TIME 3-DIMENSIONAL IMAGING USING COMPUTED TOMOGRAPHY AND INTRAOPERATIVE ULTRASOUND IN SURGERY

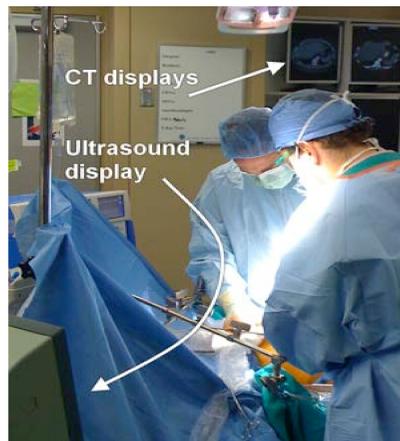


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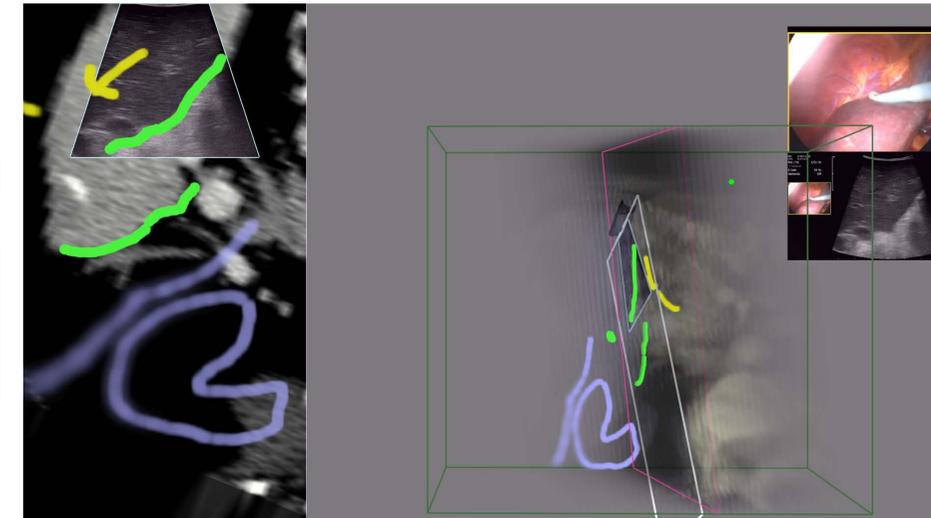
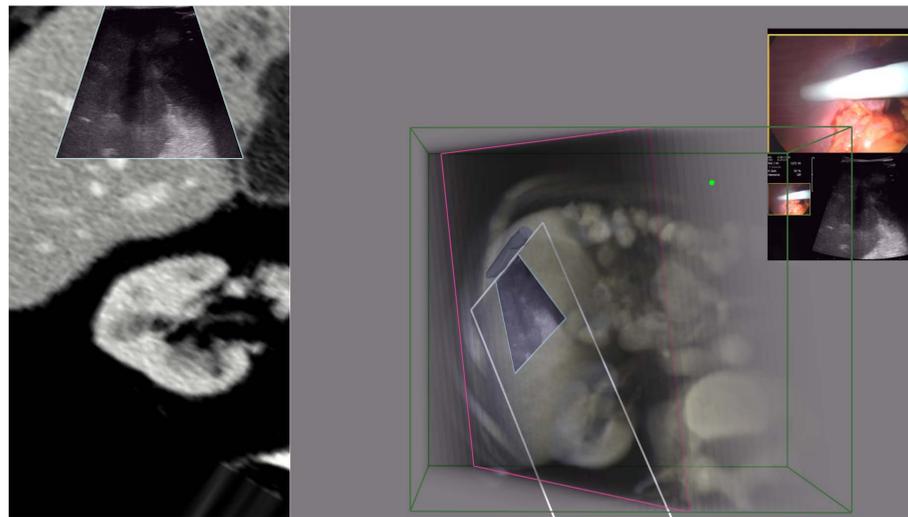
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## AIMS

- The complex anatomy of the liver is of concern when performing open or laparoscopic procedures.
- Current imaging options to reduce complications require surgeon to mentally integrate pre-op. computed tomography (CT) and intra-op ultrasound (US).
- We sought to evaluate real-time 3D imaging with fused intra-op US with pre-op CT.



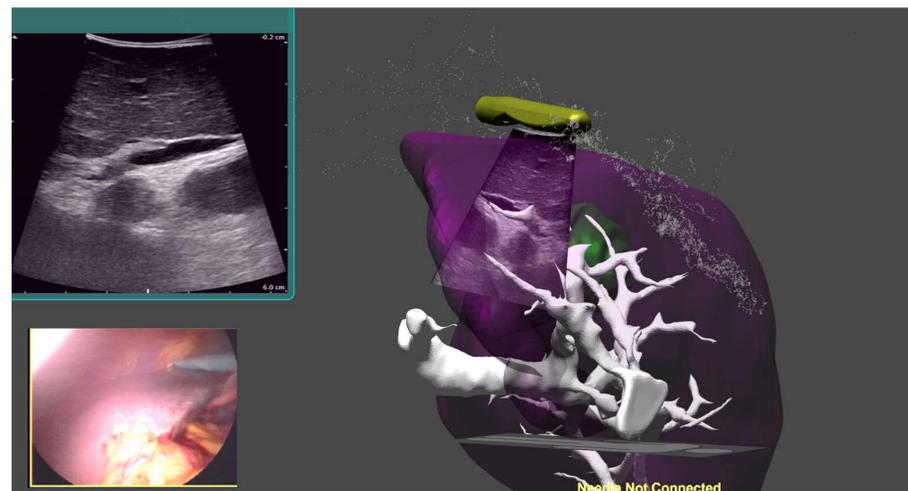
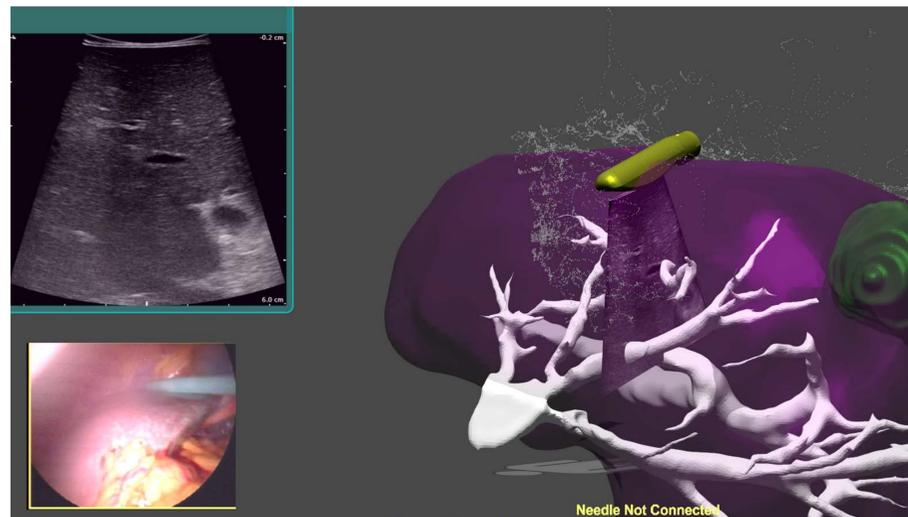
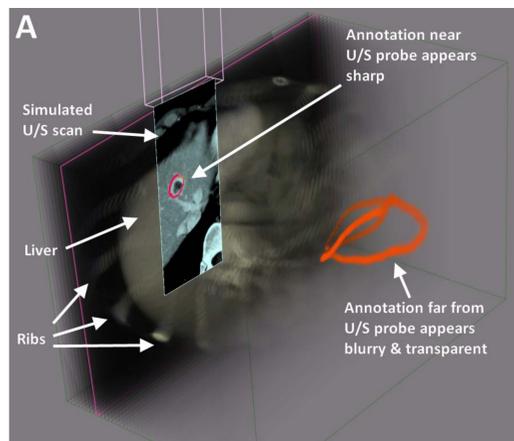
## RESULTS



- The 3D fusion technology when employed alongside conventional 2D US in a model/phantom, successfully enabled 6 surgeons to dynamically create 3D annotations, to mark and track pertinent structures (including blood vessels), and identify/mark intrahepatic tumors.
- Using the AIM-needle guidance technology, accuracy and speed of the hepatic tumor targeting was improved in experienced and novice hands

## METHODS

- 10 patients scheduled for laparoscopic abdominal procedures requiring intraoperative US were consented.
- An AIM™ magnetic guidance system (InnerOptic Technology) recorded US video and probe 3D path
- US images were spatially registered to pre-op CT images, using the umbilicus position in the CT image and in the magnetic tracking volume.
- Postoperative simulations (stereoscopic 3D animations of the US transducer moving through the patient created in parallel with corresponding US and CT images) was generated for evaluation by surgeons.
- Visualizations of both InnerOptic's Spotlight style, and a hybrid of InnerOptic and Pathfinder Technology's style, were created



## CONCLUSIONS

- This is a qualitative observational study to determine the feasibility of emerging 3D technology that combines real time 2D US with previously acquired CT images.
- This technology successfully enhanced "live" intraoperative visualization of vital hepatic structures and tumors compared to existing US technology
- These studies suggest that emerging 3D technology offers the potential to enhance and advance laparoscopic procedures while reducing intra and postoperative complications

## REFERENCES

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