

# Machine Vision for High Speed Printing

ImcRC

SPEED3D

UTS  Rapido

# SPEE3D – Australian 3D Printer Manufacturer



## Materials (powders)

- Aluminium
- Copper
- Brass
- Bronze
- Tungsten



## Compressed heated air

- No use of inert gases
- Low cost
- Reduced OH&S risk



## Robotic arm / part bed

- Robust 6 axis industrial robot
- Scalable for larger printers



## Powder spray nozzle

- Rocket nozzle fires metal powder at supersonic speed
- Fixed to the base of the machine

# The Future of Manufacturing

## Metal Parts

- > Low cost
- > On site / on demand parts
- > Quality control – 3D Scanning

## Industries This Will Impact

- > Defence (Navy, Airforce, Army)
- > Mining / Oil and Gas
- > Aerospace / Automotive
- > General industry



IMCFC

SPEED3D

UTS  Rapido

# Machine Vision for High Speed Printing

Imcrc

**SPEED3D**

UTS  Rapido

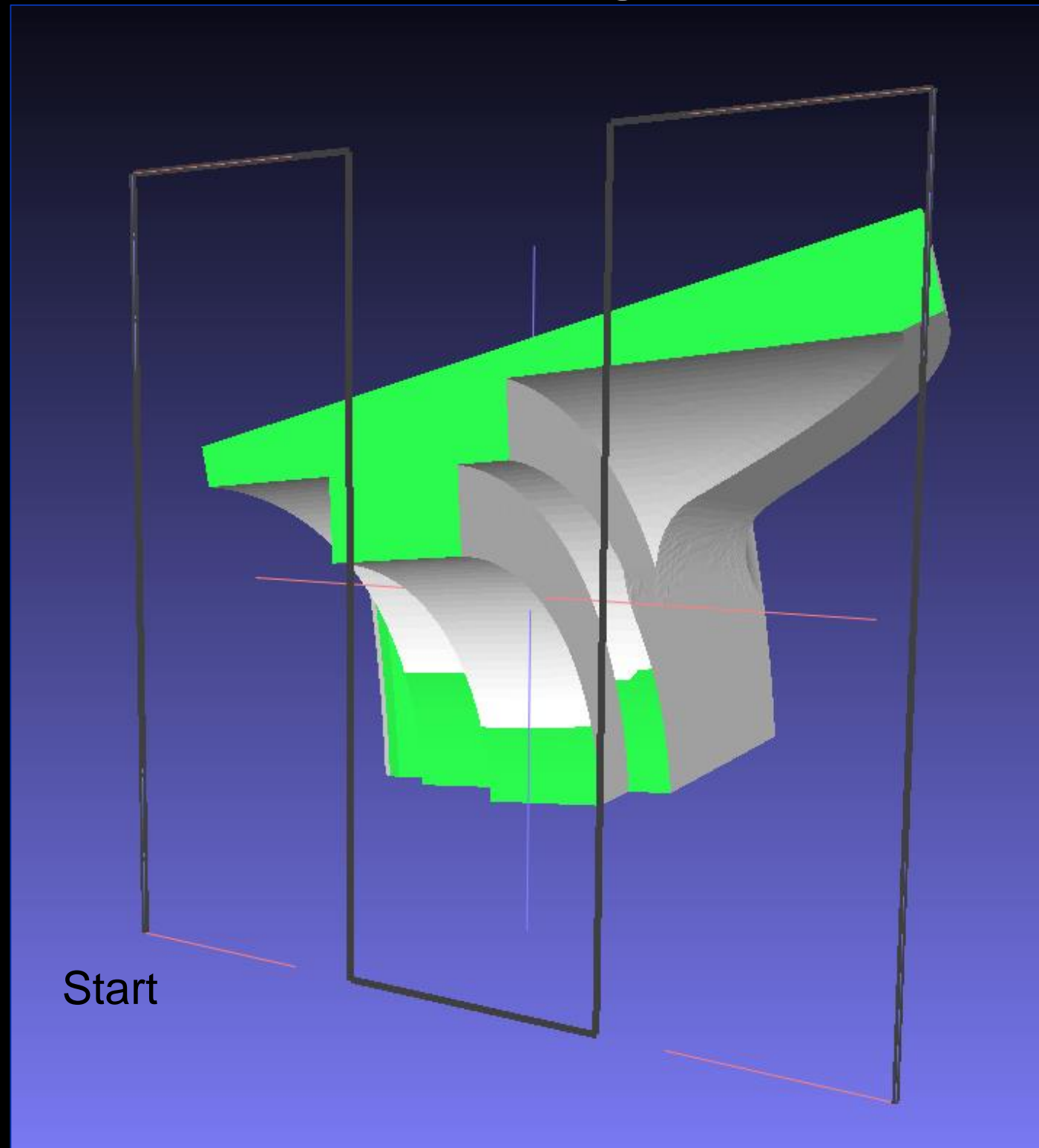
Imcrc

**SPEED3D**

UTS  Rapido



# Scanning – Path Planning



MeshLab



Guido Ranzuglia

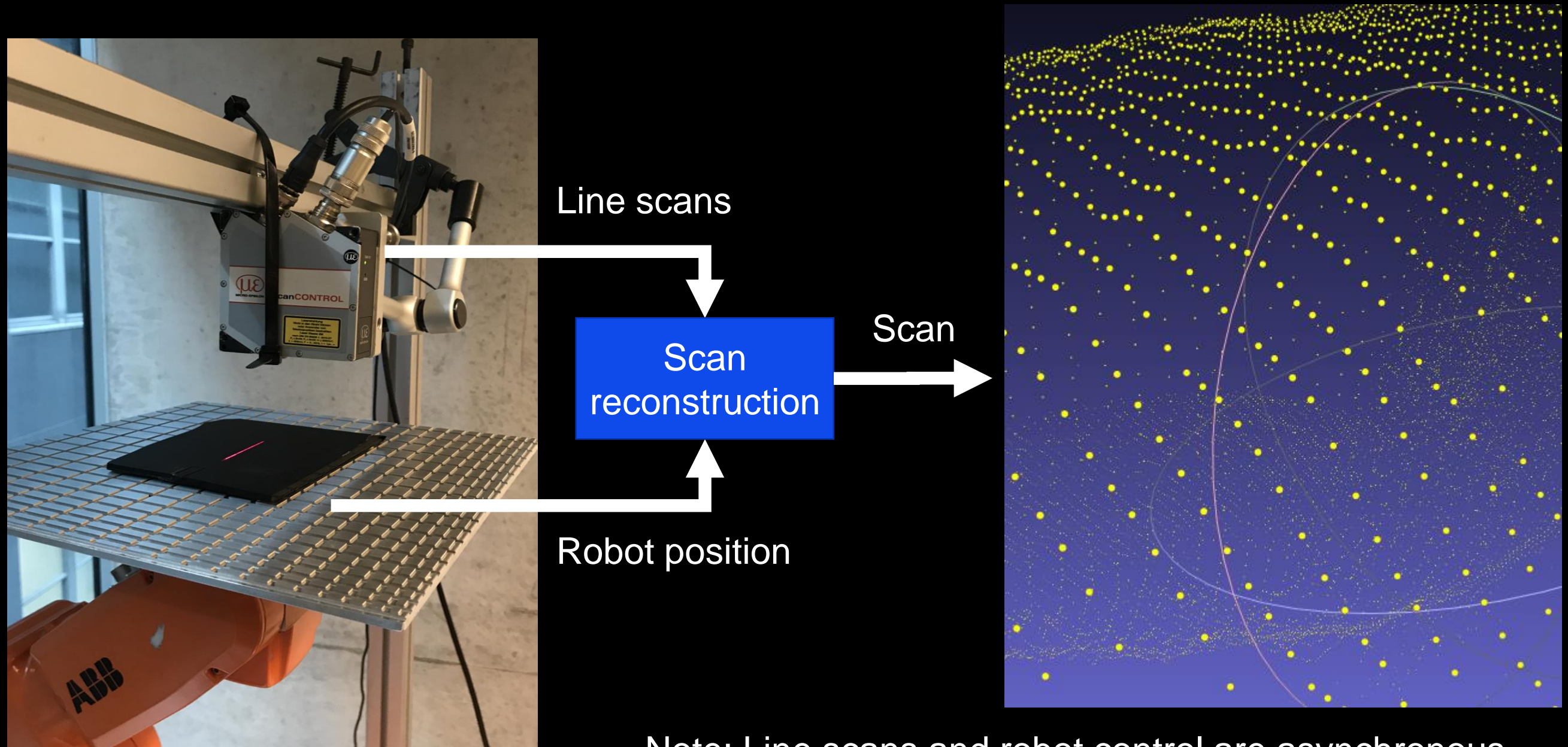


ImcRC

SPEED3D

UTS Rapido

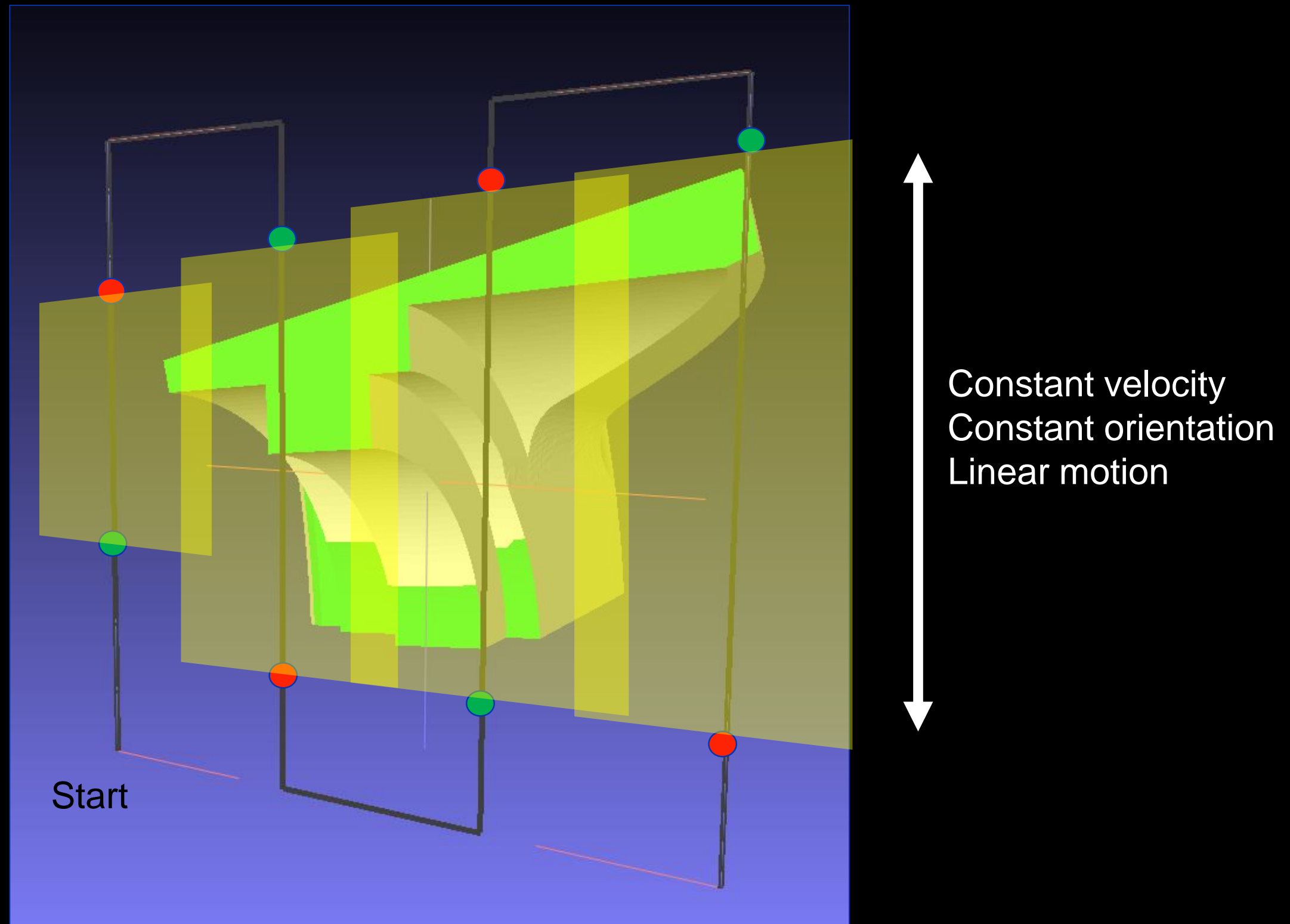
# Scanning – Registering scan data to position



Note: Line scans and robot control are asynchronous.  
How to register line scans with robot position?



# Scanning – Motion Control

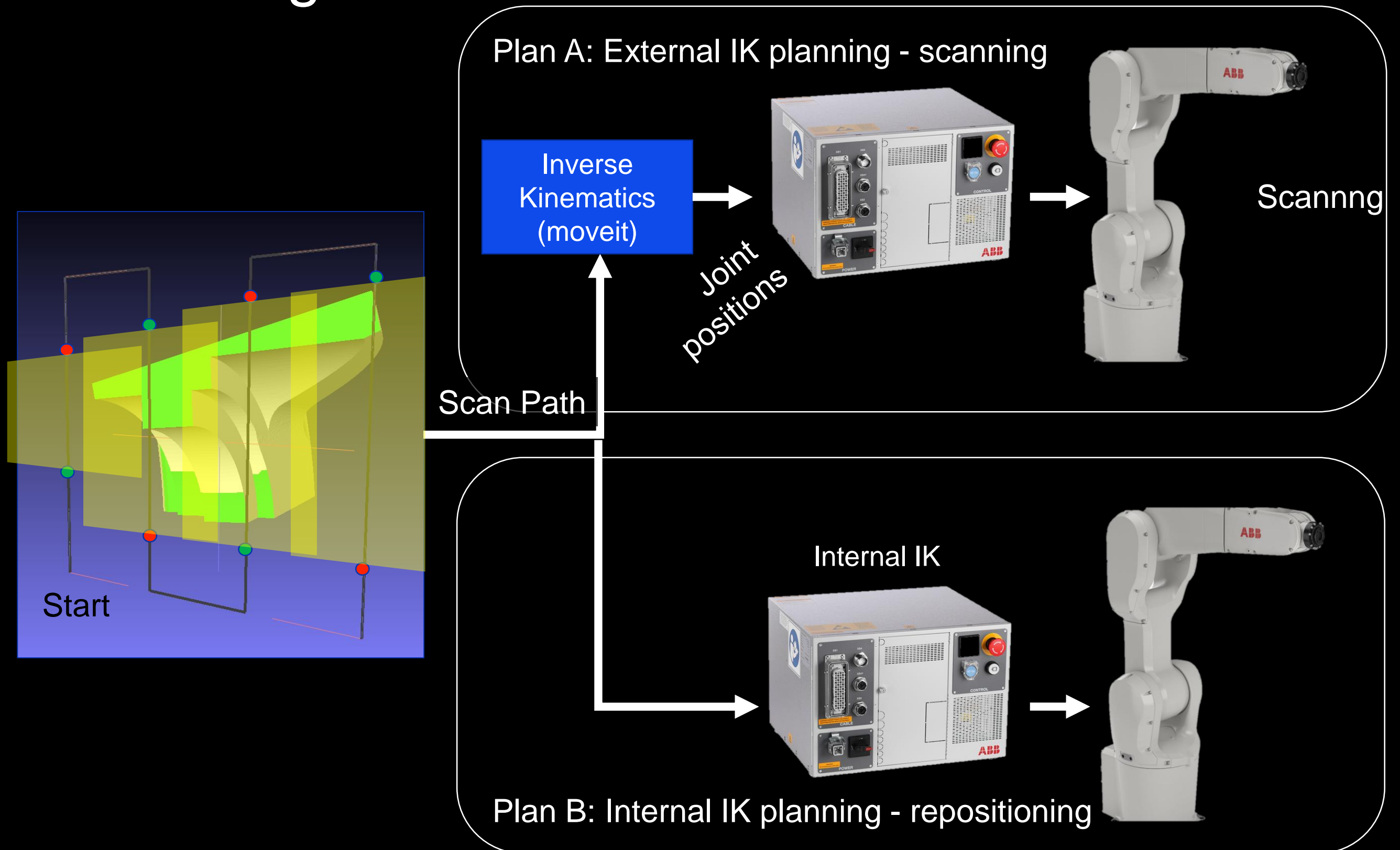


Imcrc

SPEED3D

UTS  Rapido

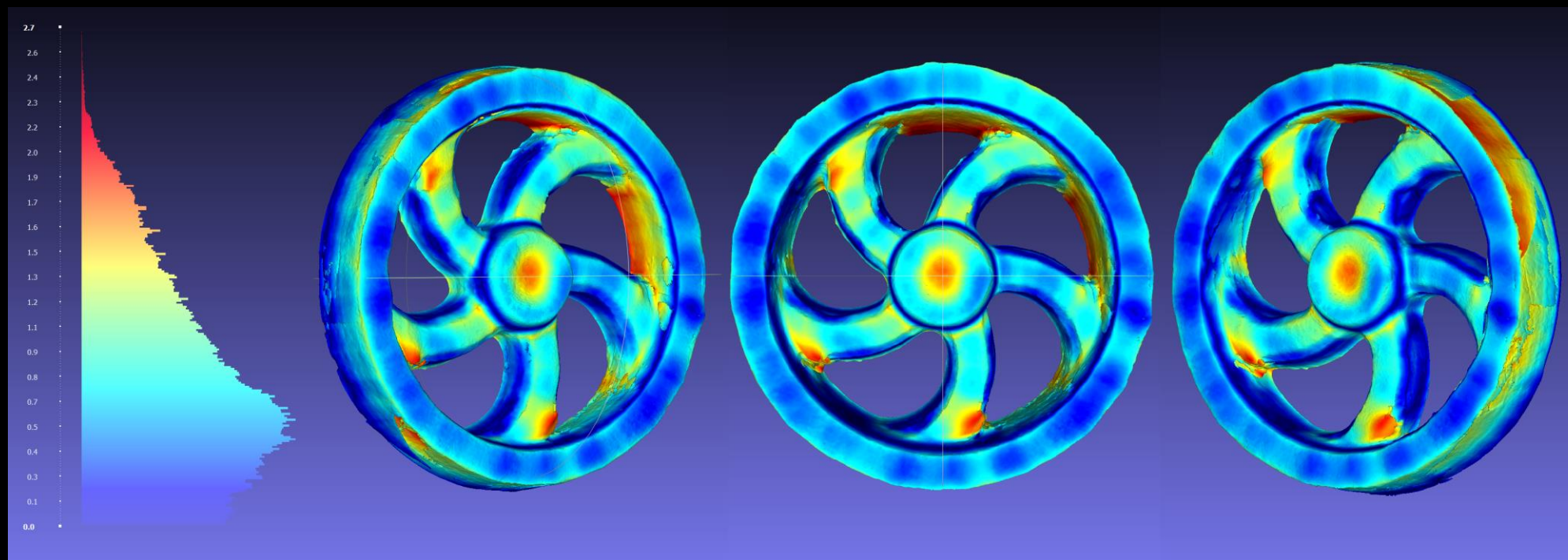
# Scanning – Motion Control Choices





# Project Results

- Retrofit scanning solution
- Minimal additional components
- 300um median error with clear part identified

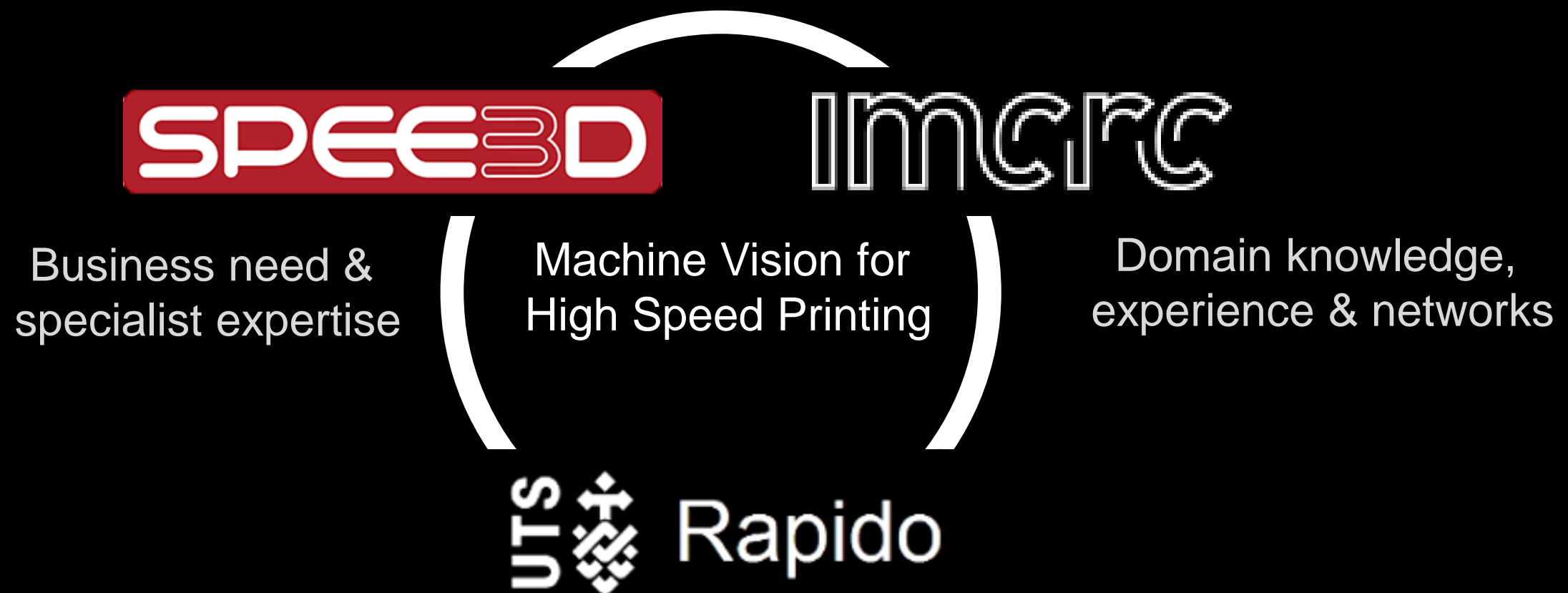


Imcra

SPEED3D

UTS  Rapido

# Collaborative Research - how it worked



## ProtoSpace

900m2 UTS 3D Printing Precinct  
*Plastic, Metal, Electronic*



## Industry focused R&D Expertise

Hervé Harvard, Director Rapido & ProtoSpace  
Dr Mickey Clemon, 3D Printing & I4.0  
Dr Don Bone, 3D Scanning

## Bespoke 3D Printing Technology

In Situ 3D Scanning - Spee3D & IMCRC  
3D Printing & I4.0, mining - MT & IMCRC  
FlexiFab, 3D Printing Open Platform

# NEW - Supersonic 3D Printing Design Challenge

- Open Industry and Research
- Best application using LightSPEE3D/WarpSPEE3D
- Submit CAD/drawing/description
- May 20<sup>th</sup> to June 30<sup>th</sup>
- Great prizes
- [www.spee3d.com](http://www.spee3d.com)



The poster features a white top section with the event title and the SPEE3D logo. The bottom section has a red background with a 3D printed part. It includes the call to action 'ENTER TO WIN', a table of challenge categories, and a registration box at the bottom.

**SUPERSONIC  
3D PRINTING  
DESIGN CHALLENGE**

**SPEE3D**

**ENTER  
TO WIN**

**CHALLENGE CATEGORIES**

INDUSTRY	RESEARCH
Top 3 entrants from OEMs, Service providers, Contract manufacturers, Design firms and Consultants	Top 3 entrants from Universities and not-for-profit institutions of higher learning

**VISIT  
WWW.SPEE3D.COM  
TO REGISTER**

ImcRC

**SPEE3D**

UTS  Rapido



# Thank you.

Imcrg

SPEED3D

UTS  Rapido