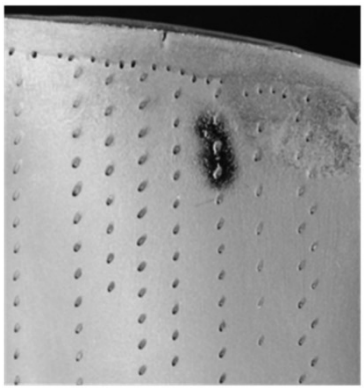


FIG. 1A

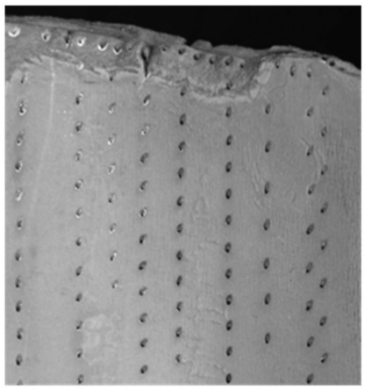


FIG. 1B

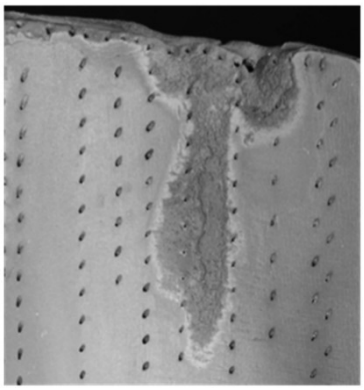


FIG. 1C

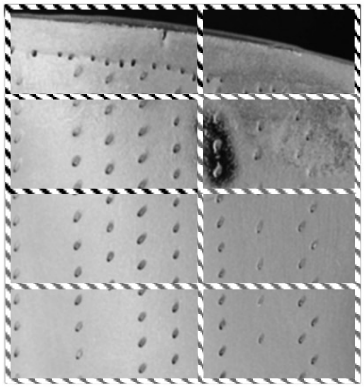


FIG. 1D

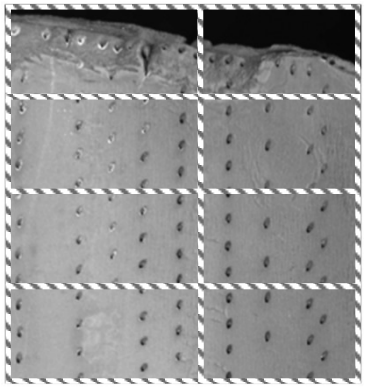


FIG. 1E

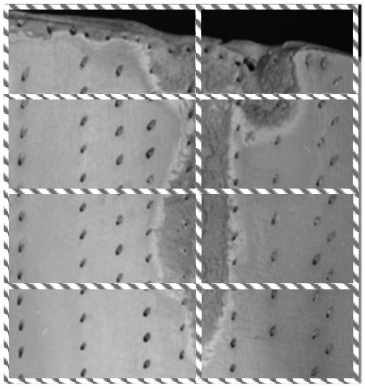


FIG. 1F

Prior Art

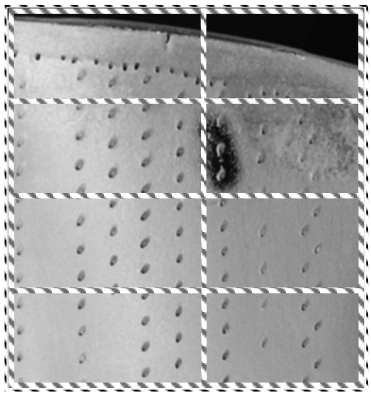


FIG. 2A

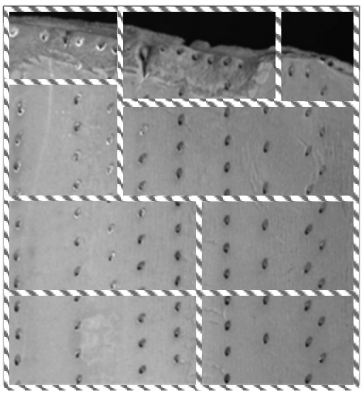


FIG. 2B

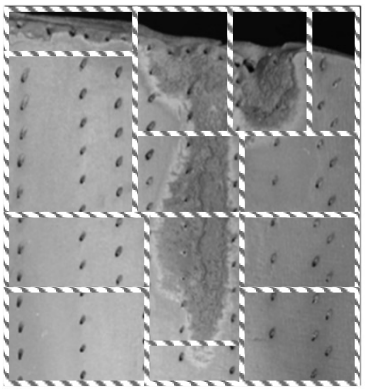


FIG. 2C

200

204

204

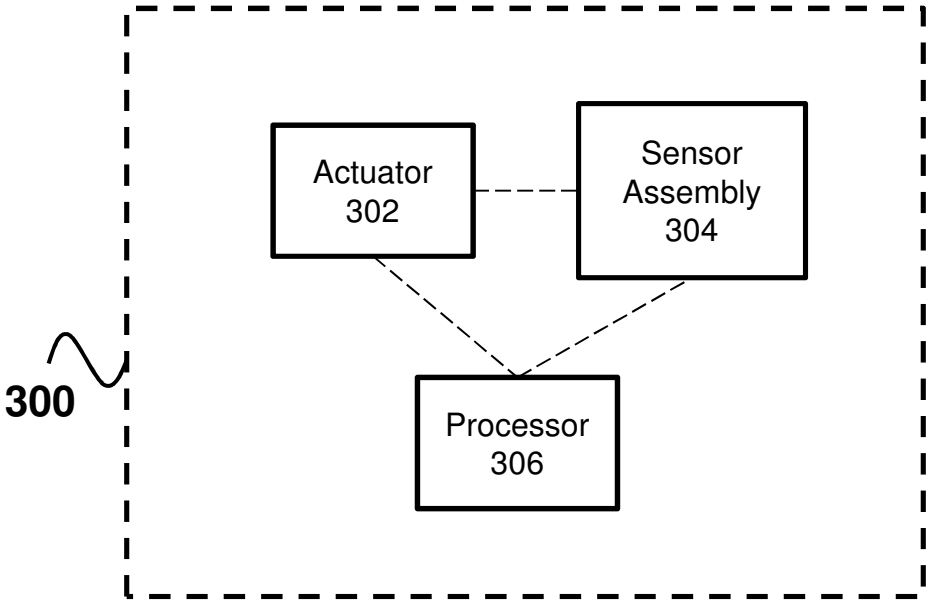

Actuator
302
Sensor
Assembly
304
Processor
306
300

FIG. 3

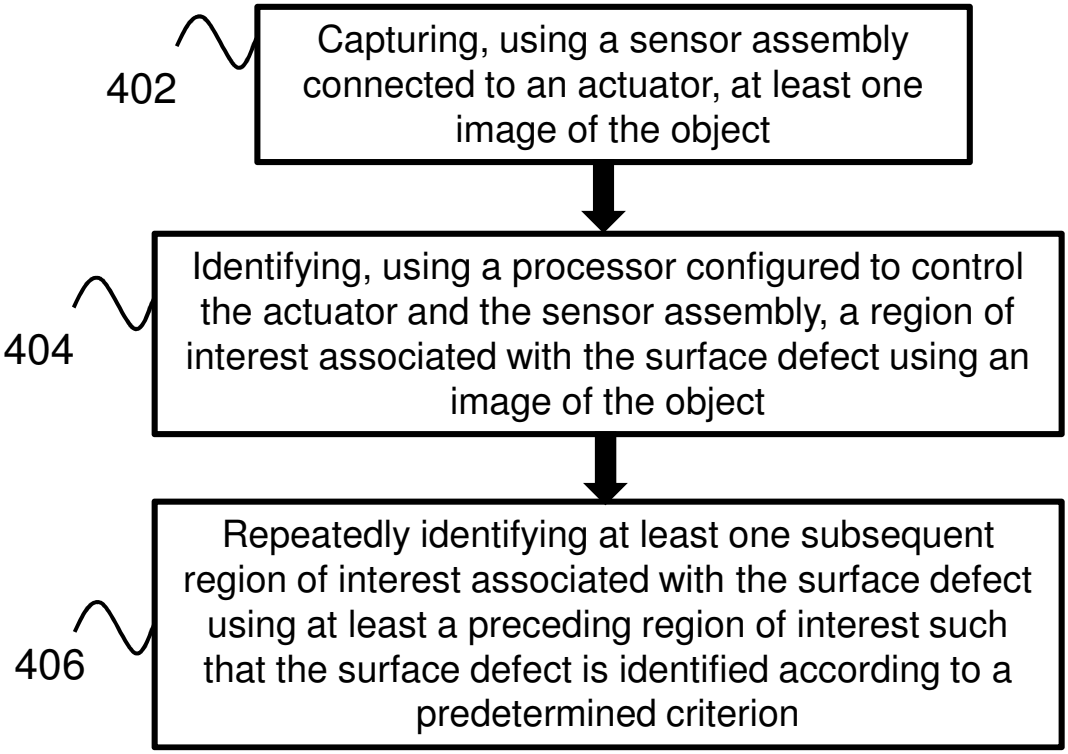

402
Capturing, using a sensor assembly connected to an actuator, at least one image of the object
404
Identifying, using a processor configured to control the actuator and the sensor assembly, a region of interest associated with the surface defect using an image of the object
406
Repeatedly identifying at least one subsequent region of interest associated with the surface defect using at least a preceding region of interest such that the surface defect is identified according to a predetermined criterion
400

FIG. 4

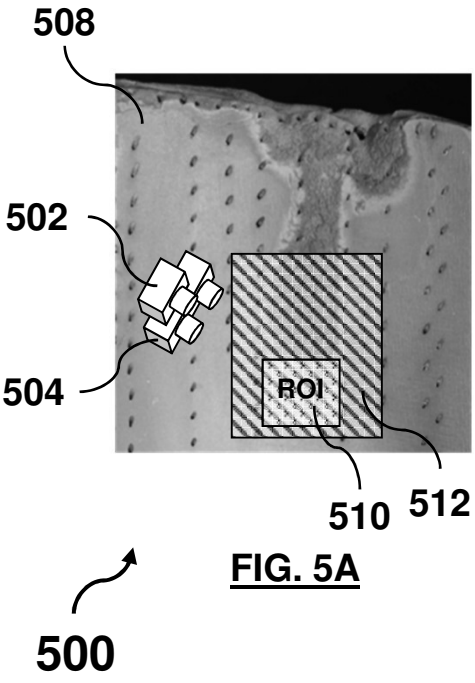


FIG. 5A

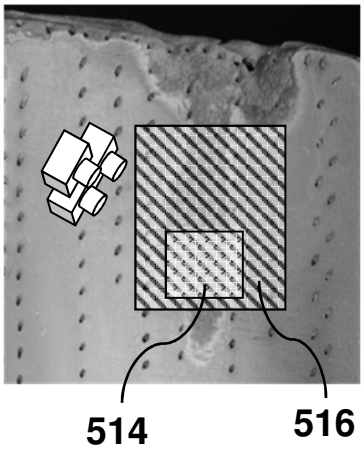


FIG. 5B

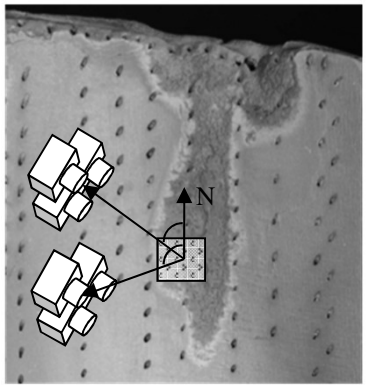


FIG. 5C

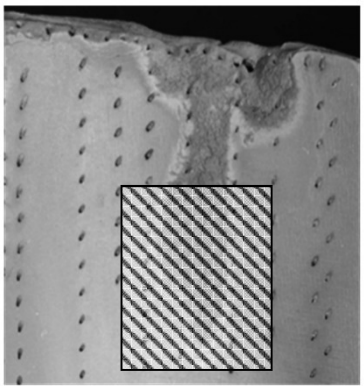


FIG. 6A

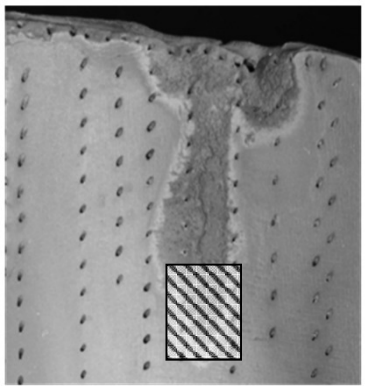


FIG. 6B

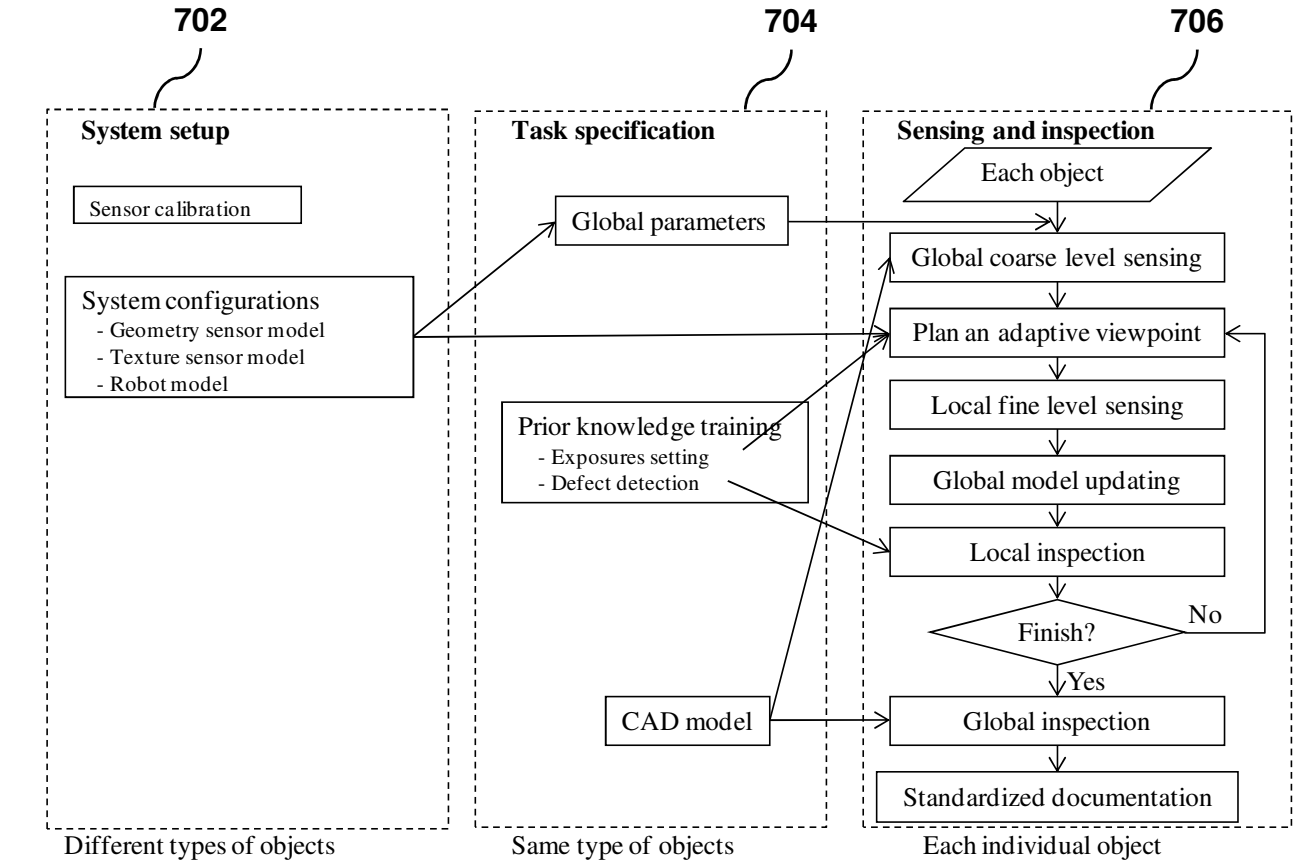

702
704
706
System setup
Sensor calibration
System configurations
- Geometry sensor model
- Texture sensor model
- Robot model
Task specification
Global parameters
Prior knowledge training
- Exposures setting
- Defect detection
CAD model
Sensing and inspection
Each object
Global coarse level sensing
Plan an adaptive viewpoint
Local fine level sensing
Global model updating
Local inspection
Finish?
No
Yes
Global inspection
Standardized documentation
Different types of objects
Same type of objects
Each individual object
700

FIG. 7

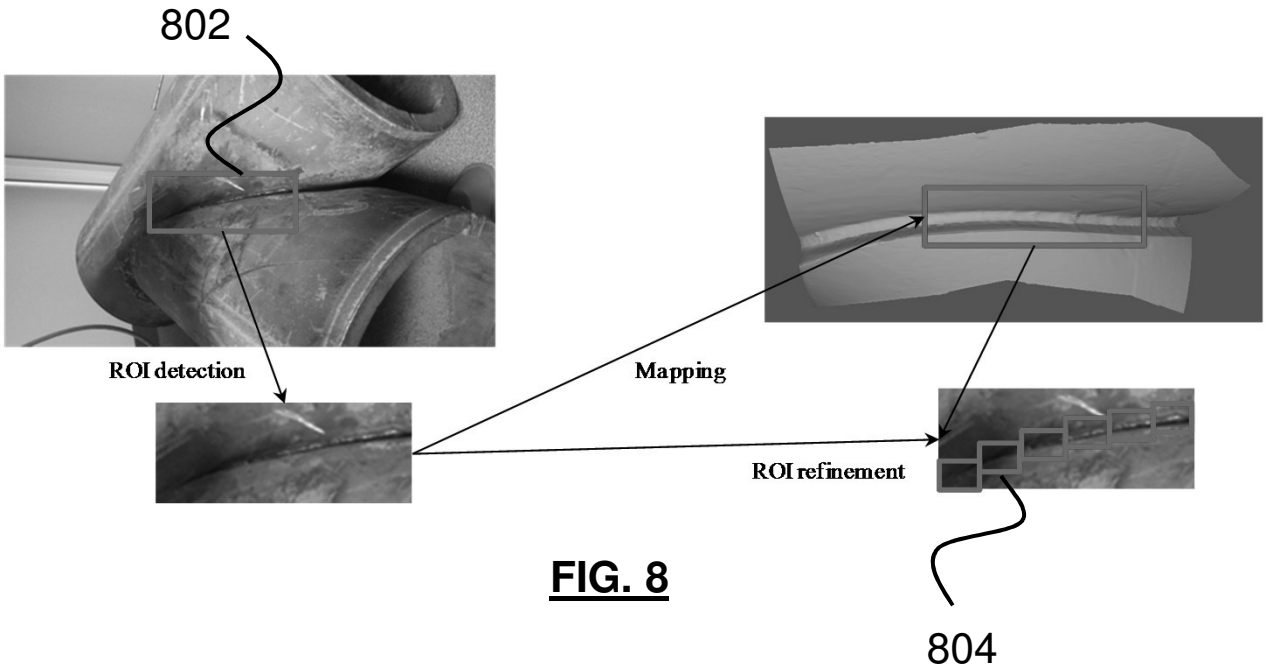

802
ROI detection
Mapping
ROI refinement
804

FIG. 8

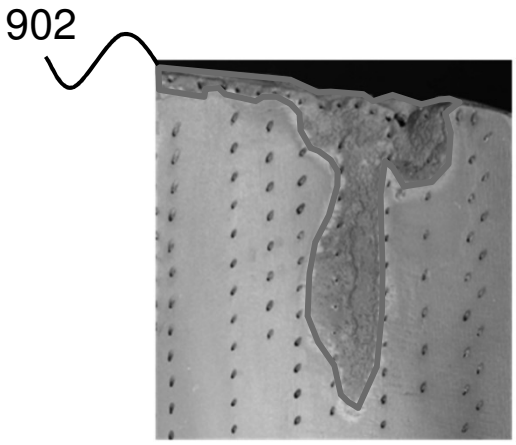


FIG. 9A

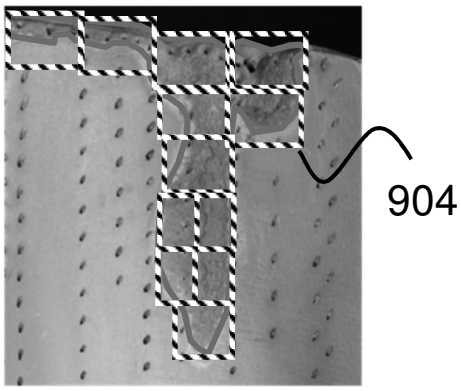


FIG. 9B

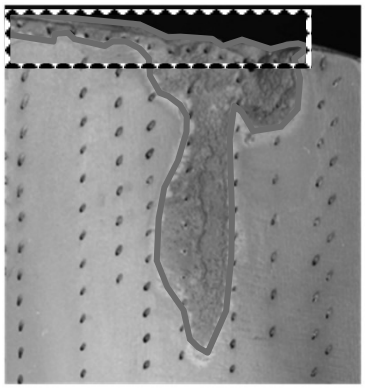


FIG. 10A

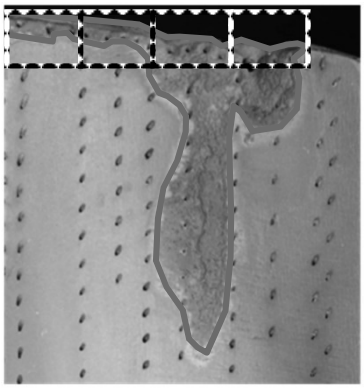


FIG. 10B

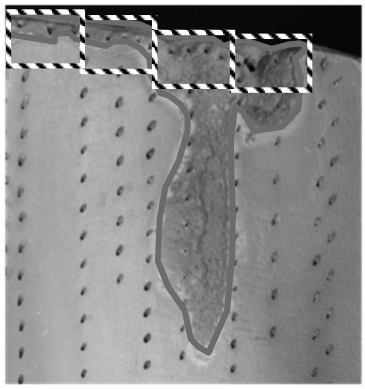


FIG. 10C

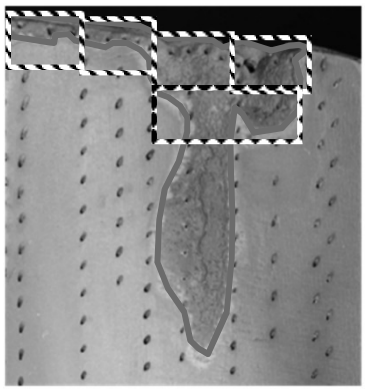


FIG. 10D

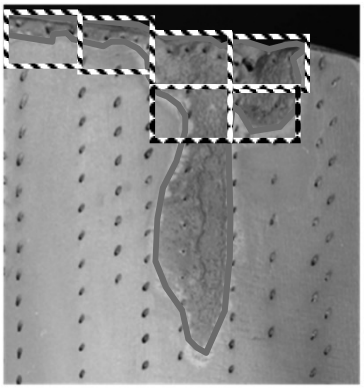


FIG. 10E

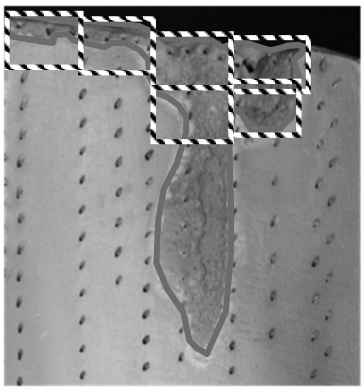


FIG. 10F

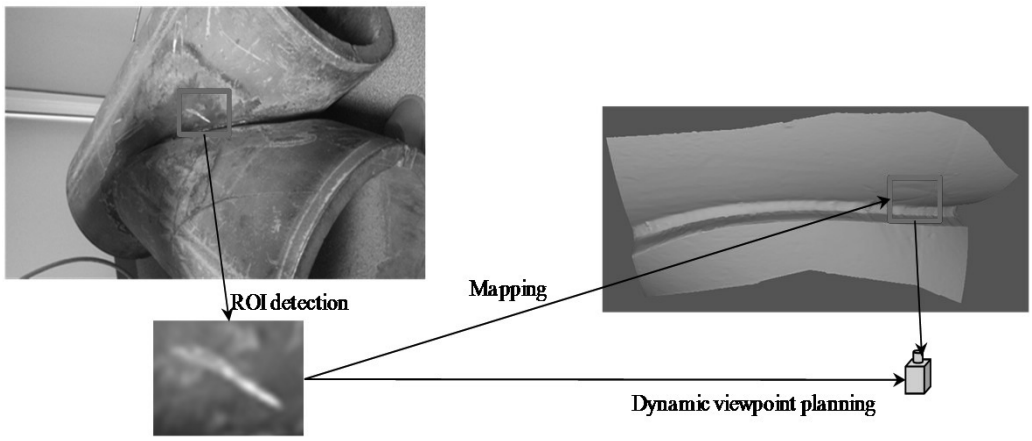

ROI detection
Mapping
Dynamic viewpoint planning

FIG. 11

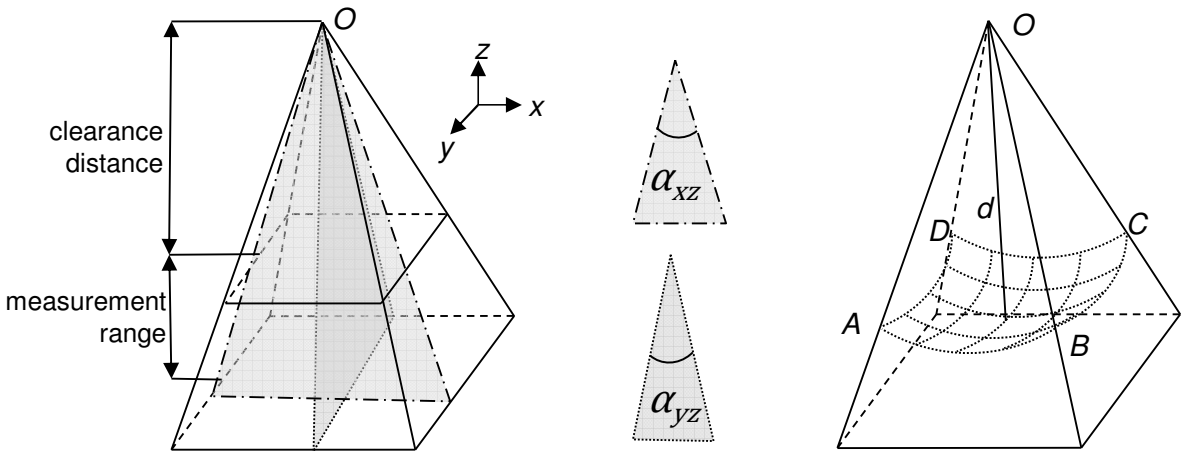

O
z
x
y
clearance distance
measurement range
α_{xz}
α_{yz}
O
d
D
C
A
B

FIG. 12

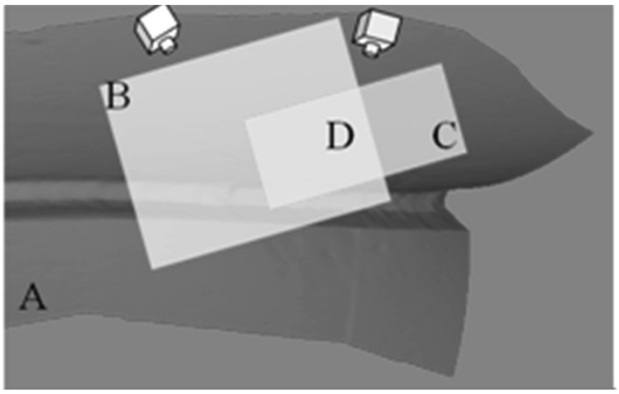


FIG. 13A

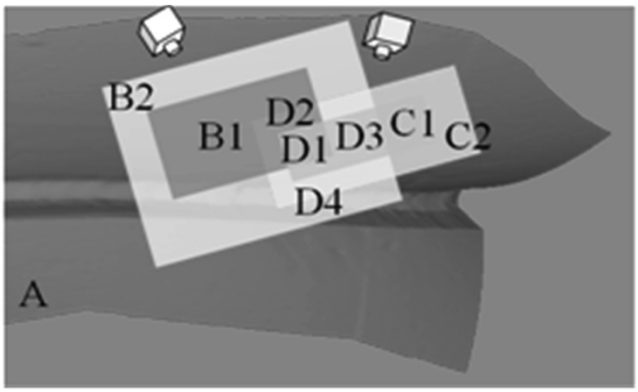


FIG. 13B

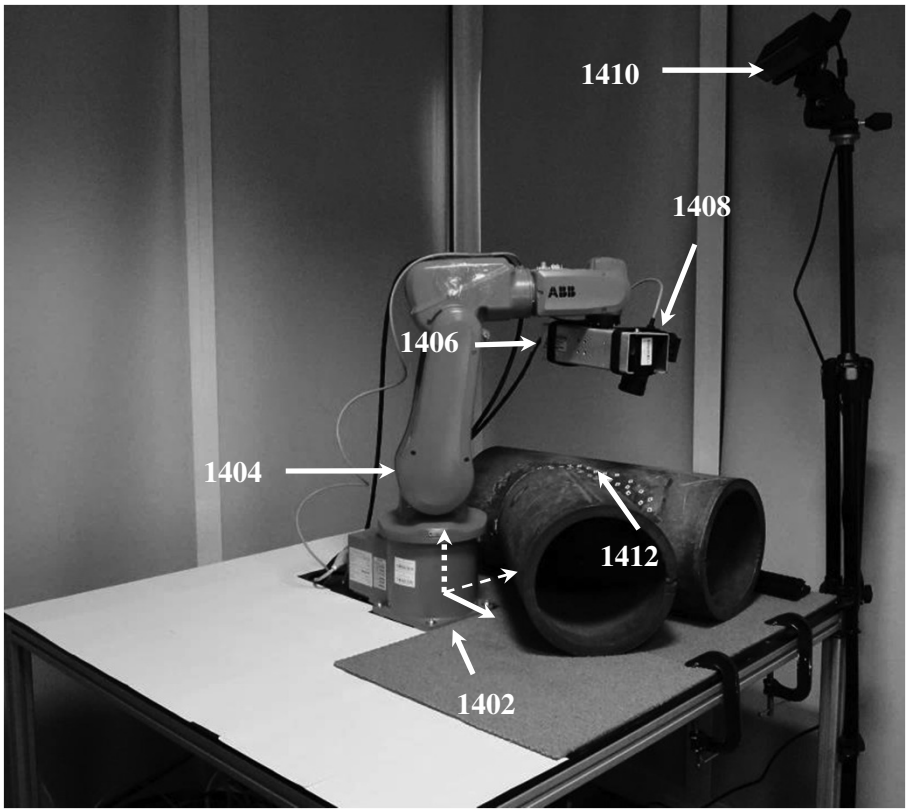


FIG. 14

1400



FIG. 15A



FIG. 15B

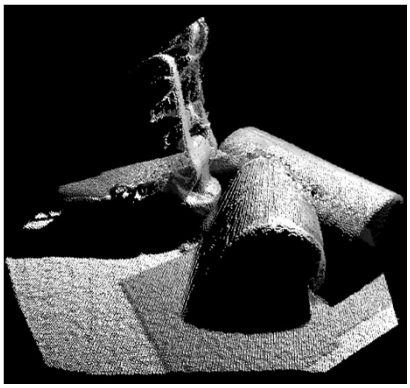


FIG. 15C

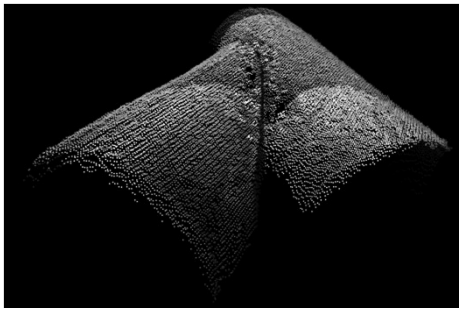


FIG. 15D

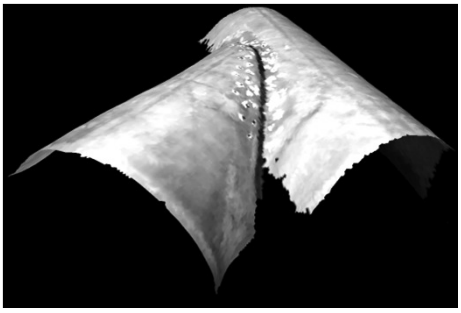


FIG. 15E

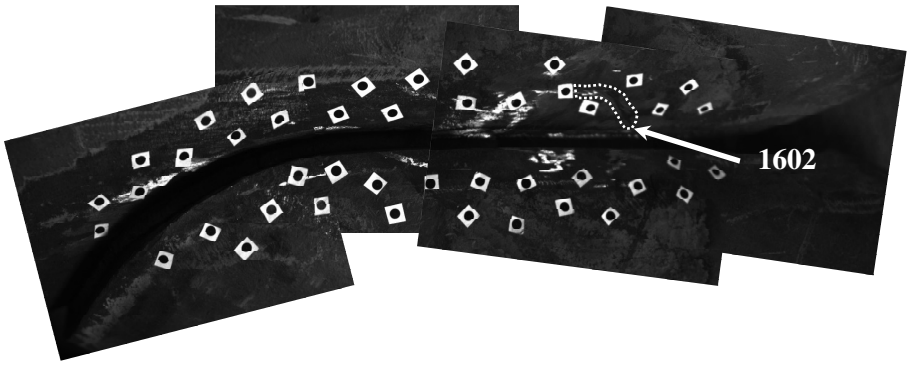


FIG. 16

1600

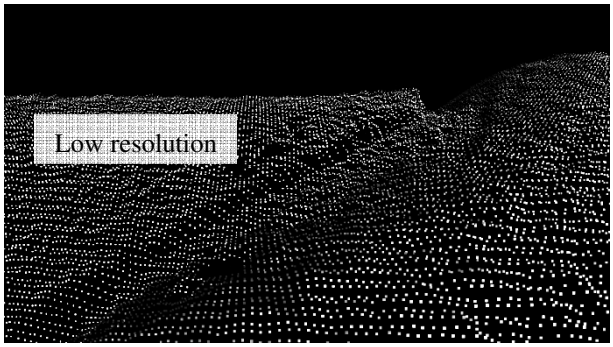


FIG. 17A

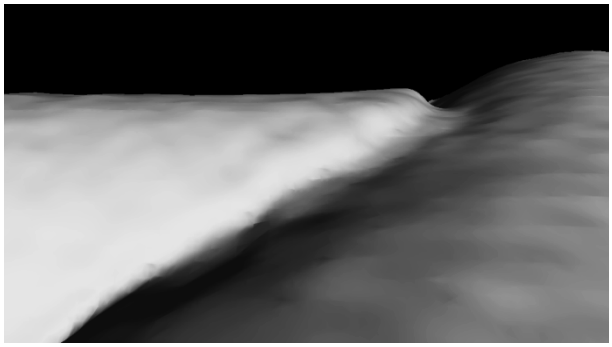


FIG. 17B

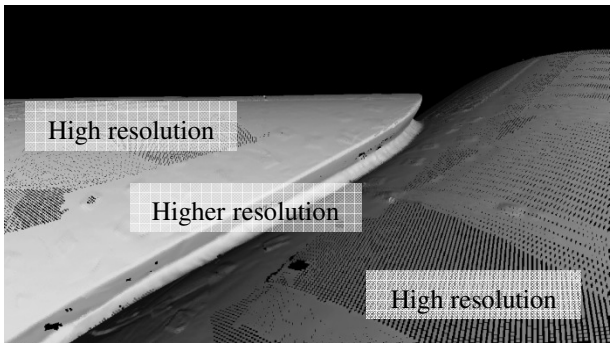


FIG. 17C

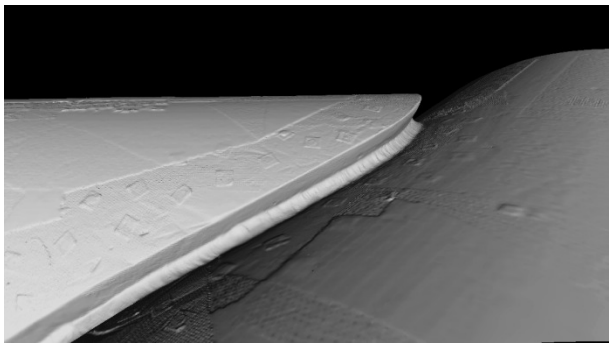
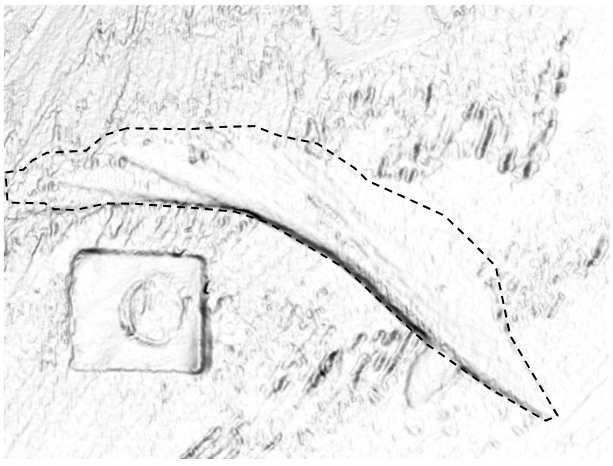
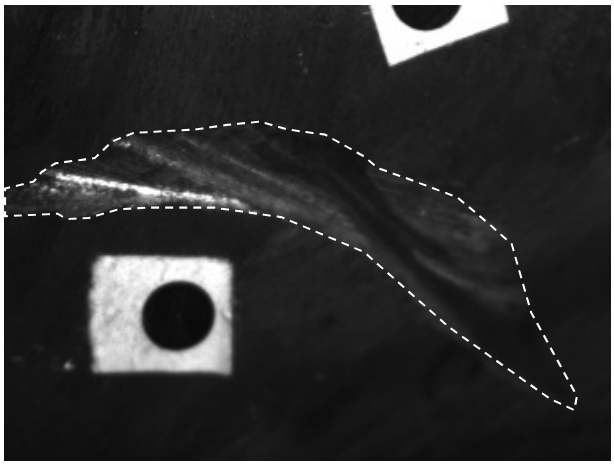


FIG. 17D



1800

FIG. 18A



1800

FIG. 18B