Chris Lowenstein – Sikorsky Aircraft

The Future of Investigation Technology

A disclaimer

The future of large/sophisticated civil aircraft investigations may be very different:

- Telemetered satellite data
- Downlinked FDR/Mission Systems data

Helicopters and most military aircraft will remain a scene-based evolution for quite some time

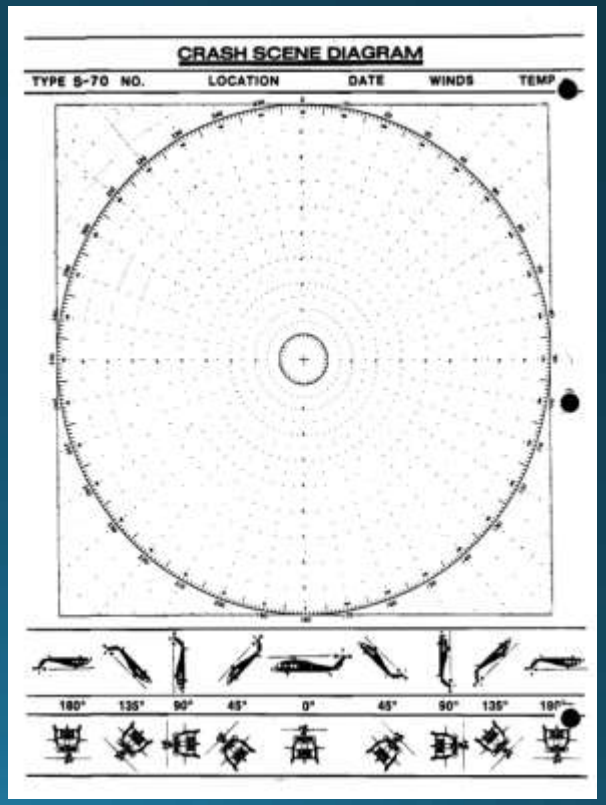
Some newer military fixed-wing may have more advanced on-board recording/telemetry capability

Old technology

Kicking tin

35mm film photography

Manual scene diagrams



Current technology

Paper 'coloring' books

Traditional digital photography

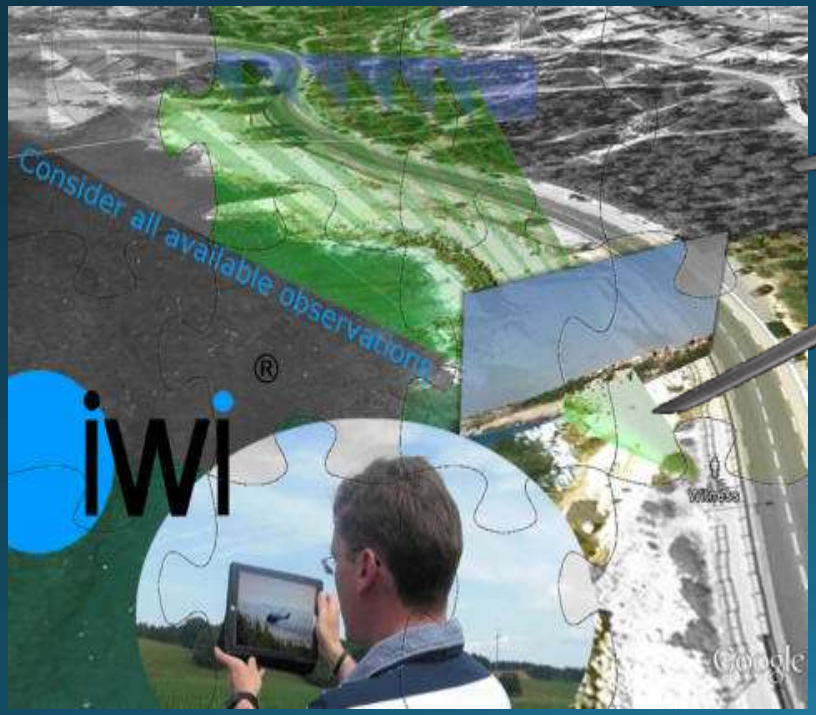
GPS geo-tagging of parts

Advancing technology

On-board video sources

Drone/UAV overhead photography

Immersive witness interviewing



Advancing technology

Drone flight path can be pre-programmed

Future technology

Augmented reality on site

Shape/object/image recognition

Fully integrated photography/geo-tagging

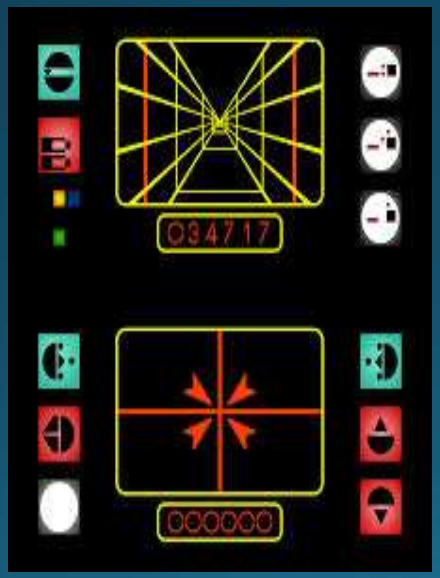
Creation of a 'virtual accident site'

Augmented reality

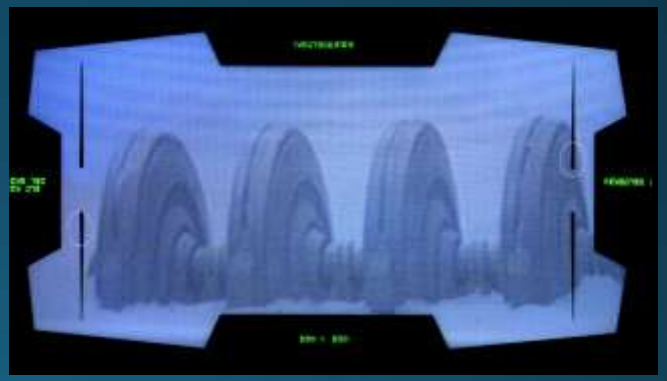
It's been around at least since 1977

(in George Lucas's mind at least)

Imperial TIE fighter targeting computer



Alliance X-Wing fighter targeting computer



Imperial AT-AT targeting computer

Augmented reality *is* reality!

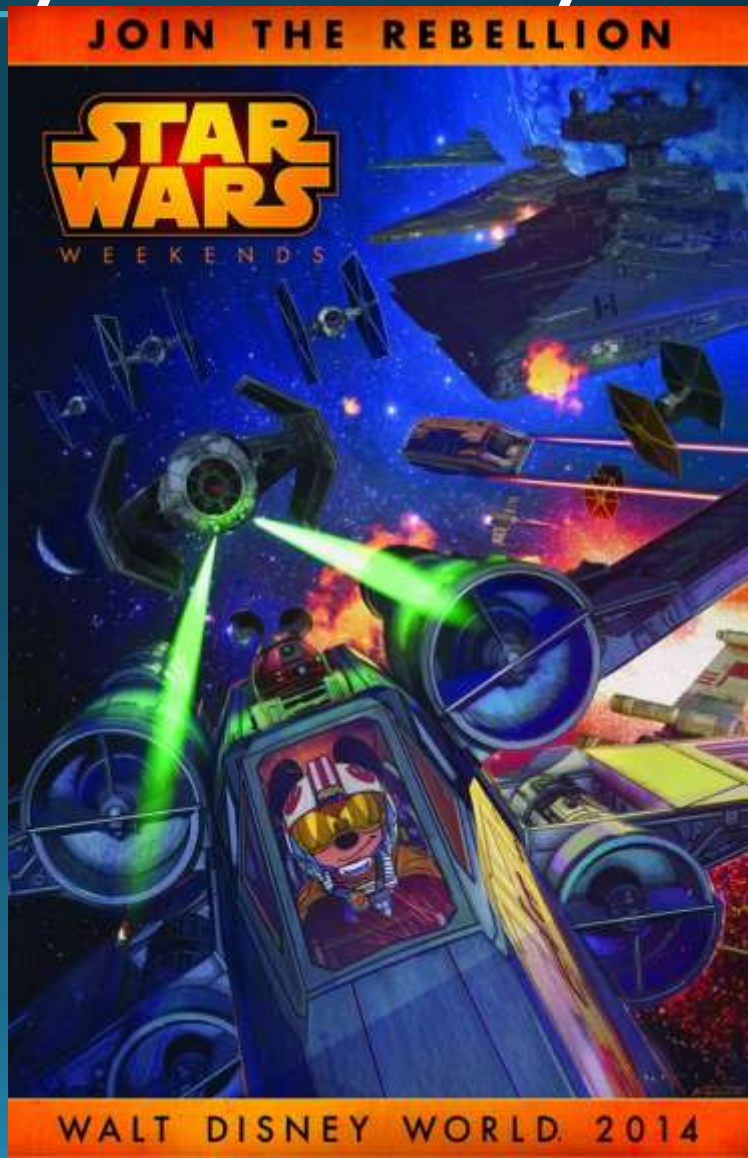
Aurasma – a cloud-based AR platform

'Trigger images' initiate the augmented reality

Launch videos, sound, or other events

No bar codes, it's just shapes – like a visual 'Shazam'

Demonstration



How does this help us?

Shape recognition/part identification via augmented reality

Encode entire Illustrated Parts Catalog

Identify and geo-tag parts as you walk the scene

AR with wearable technology

Google Glass (or similar gear)

Integrate the scene documentation

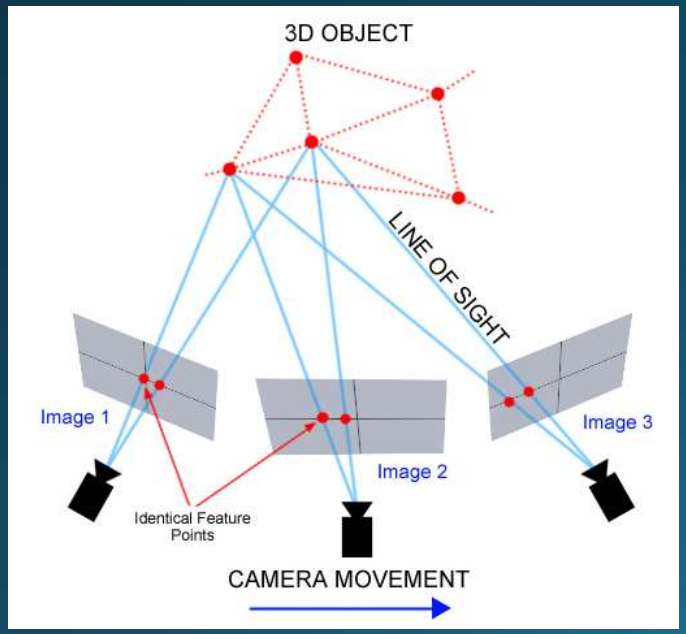
Preserve the evidence from day one

Advanced photogrammetry

Multi-camera viewpoints

Video or still motion-tracking software

Measure and analyze after the fact

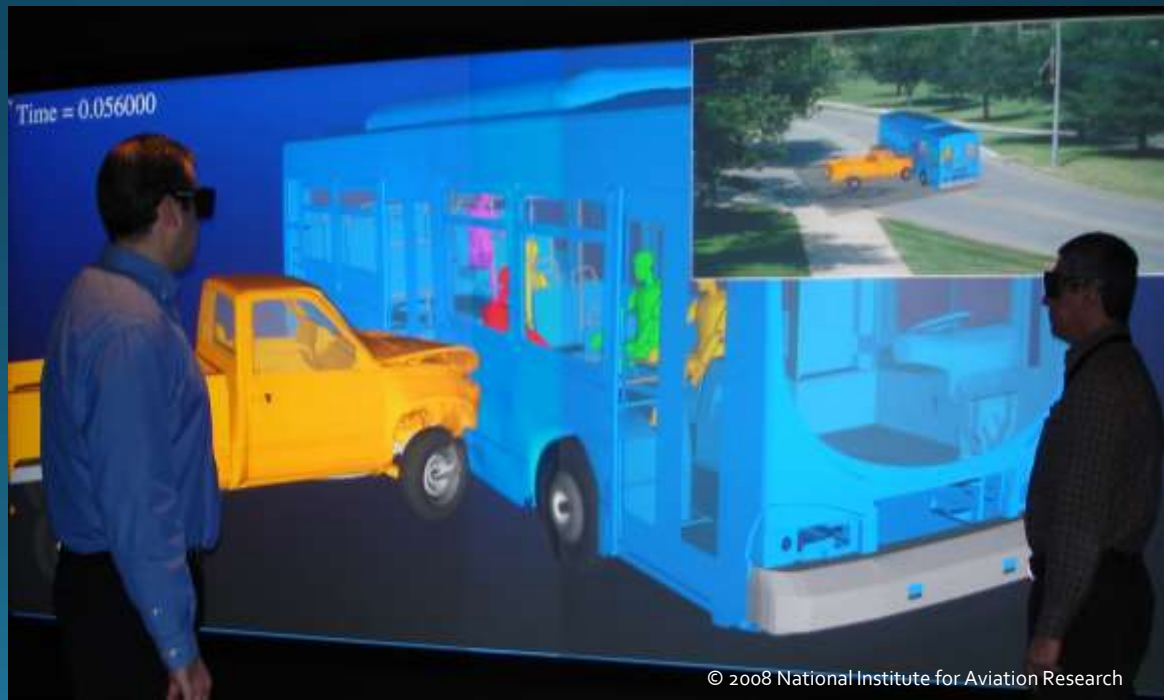


http://www.kineticorp.com/forensic-photogrammetry.aspx

https://www.clemson.edu/restoration/wlcc/_files/photogrammetry.jpg

Rapid scene documentation

- Place parts in exact scene location
- Include overhead UAV, panoramas, and photgrammetry
- Allow virtual scene reconstruction



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Virtual Reality (VR)

Allows 24/7 access to scene, forever

Perishable evidence is preserved

Multiple scenarios may be evaluated

On-scene streaming video

The M56A2 'SmartGun' used by Colonial Marines in the movie *Aliens*

Stream video and audio back to SMEs

Allows for real-time assessments

Substantial security and protocol issues!

© http://avp.wikia.com/wiki/Aliens_(film)

Tech gear currently available

Google Glass – Augmented Reality

Epson Moverio – Augmented Reality

Star 1200XL – Augmented Reality

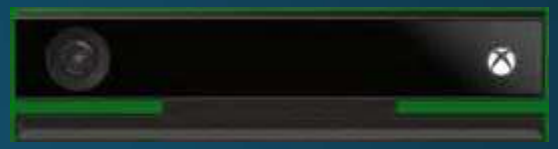
Oculus Rift – Virtual Reality

Microsoft Kinect – Motion sensor, used with Oculus Rift

3-D Gaming engines – VR world creation

Samsung cell phones, used with Oculus Gear VR

HTC Vive – Virtual Reality

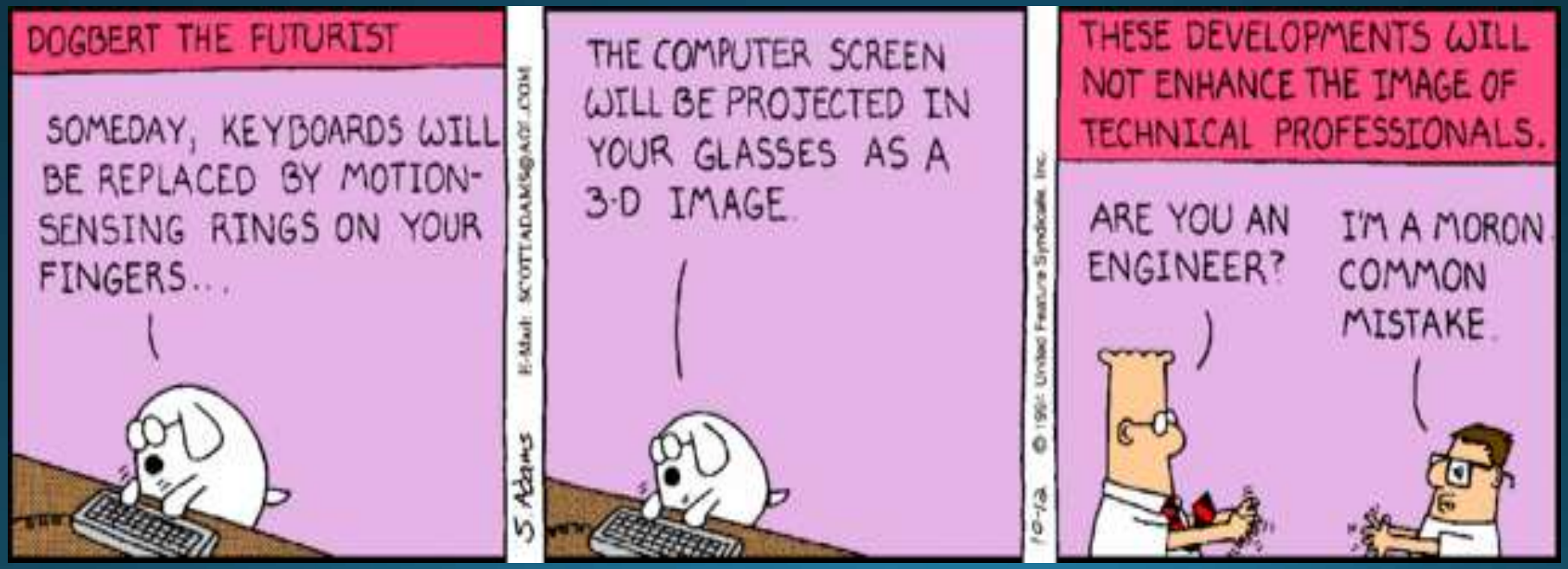


How do we implement?

Just do it! And share best practices

Encourage university and industry research

As we improve our investigations, we improve flight safety



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