Living in the Holo(s)cene

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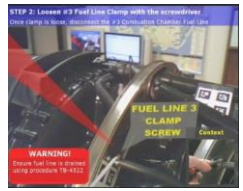
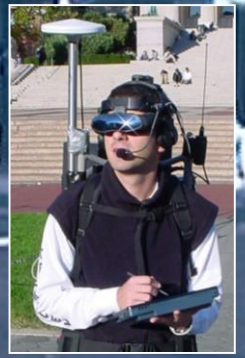


Navigation



Columbia *Touring Machine*, 1996–

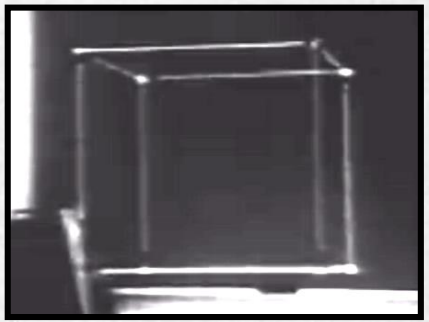
Games

O. Oda et al., 2009

Task Assistance

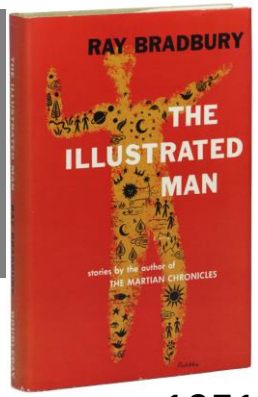
S. Henderson & S. Feiner, *ISMAR 2011*

> 45 Years of VR/AR Research



Ivan Sutherland, Head-tracked VR/AR, 1968

The Ultimate Display



1951

“The ultimate display would, of course, be a room within which the computer can control the existence of matter. A chair displayed in such a room would be good enough to sit in. Handcuffs displayed in such a room would be confining, and a bullet displayed in such a room would be fatal. With appropriate programming such a display could literally be the Wonderland into which Alice walked.”

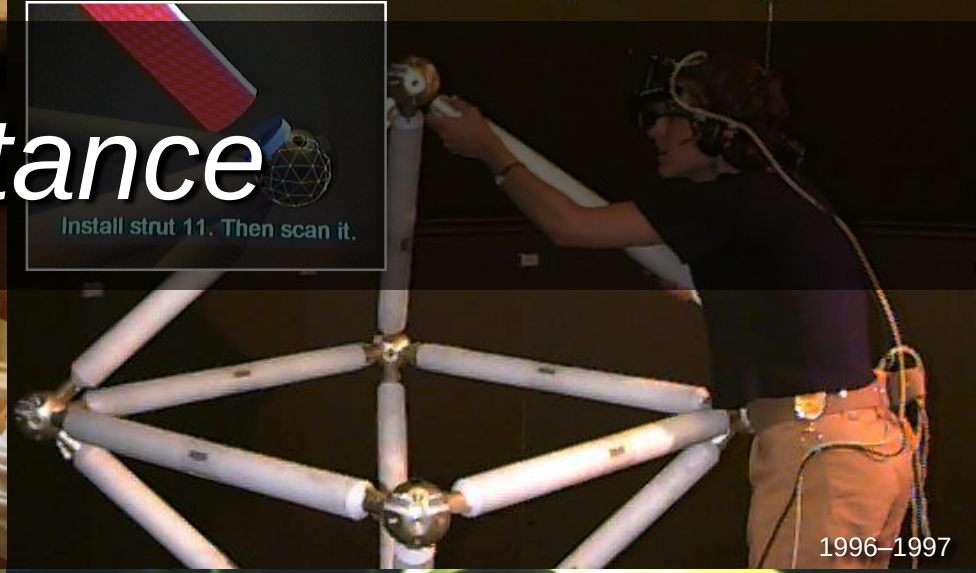
— I. Sutherland, The Ultimate Display, *Proc. IFIP 65*, 506–508, 1965

The Ultimate Display

- Multimodal
- But,…
  - One user
  - One room
  - Indoors

AR Task Assistance

1991–1993

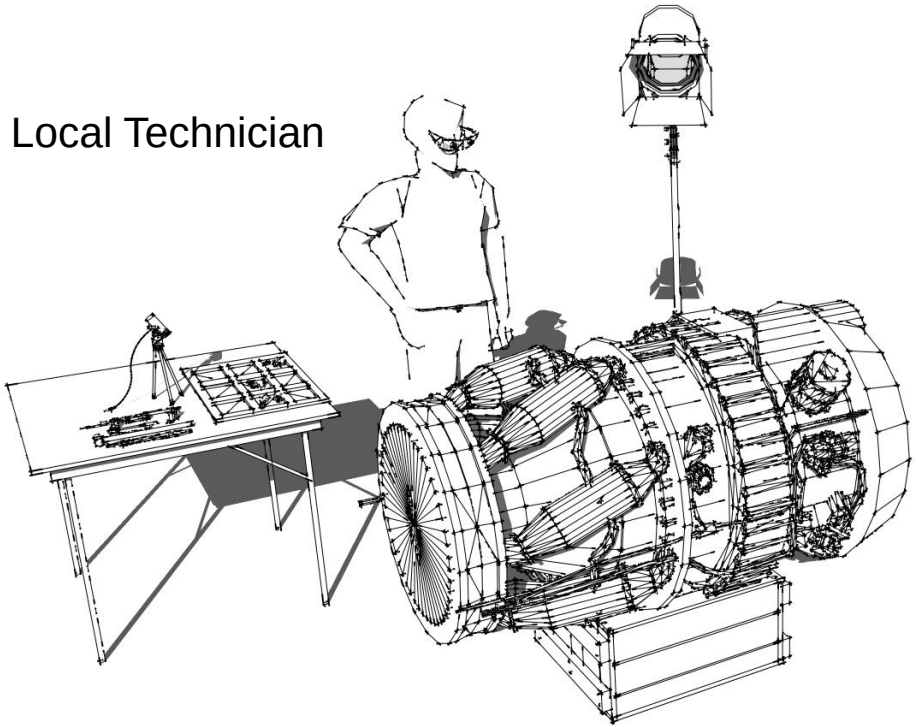


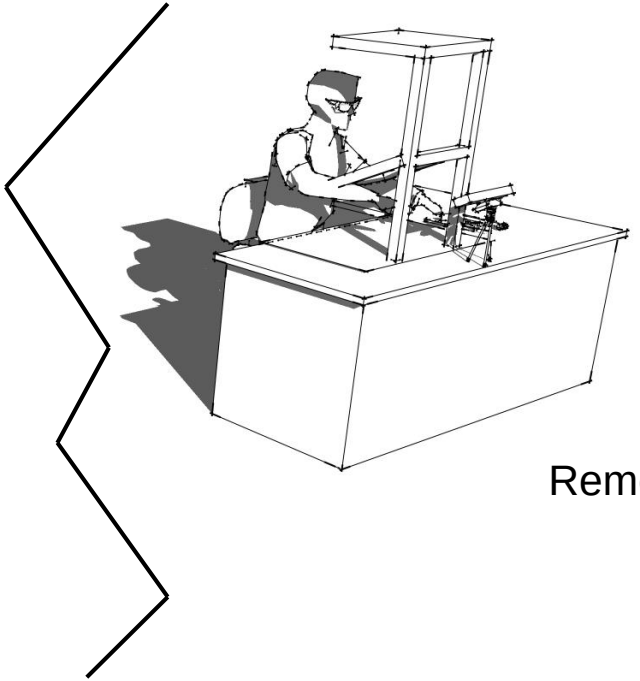
1996–1997

2007–2008

2011–

AR Remote Task Assistance





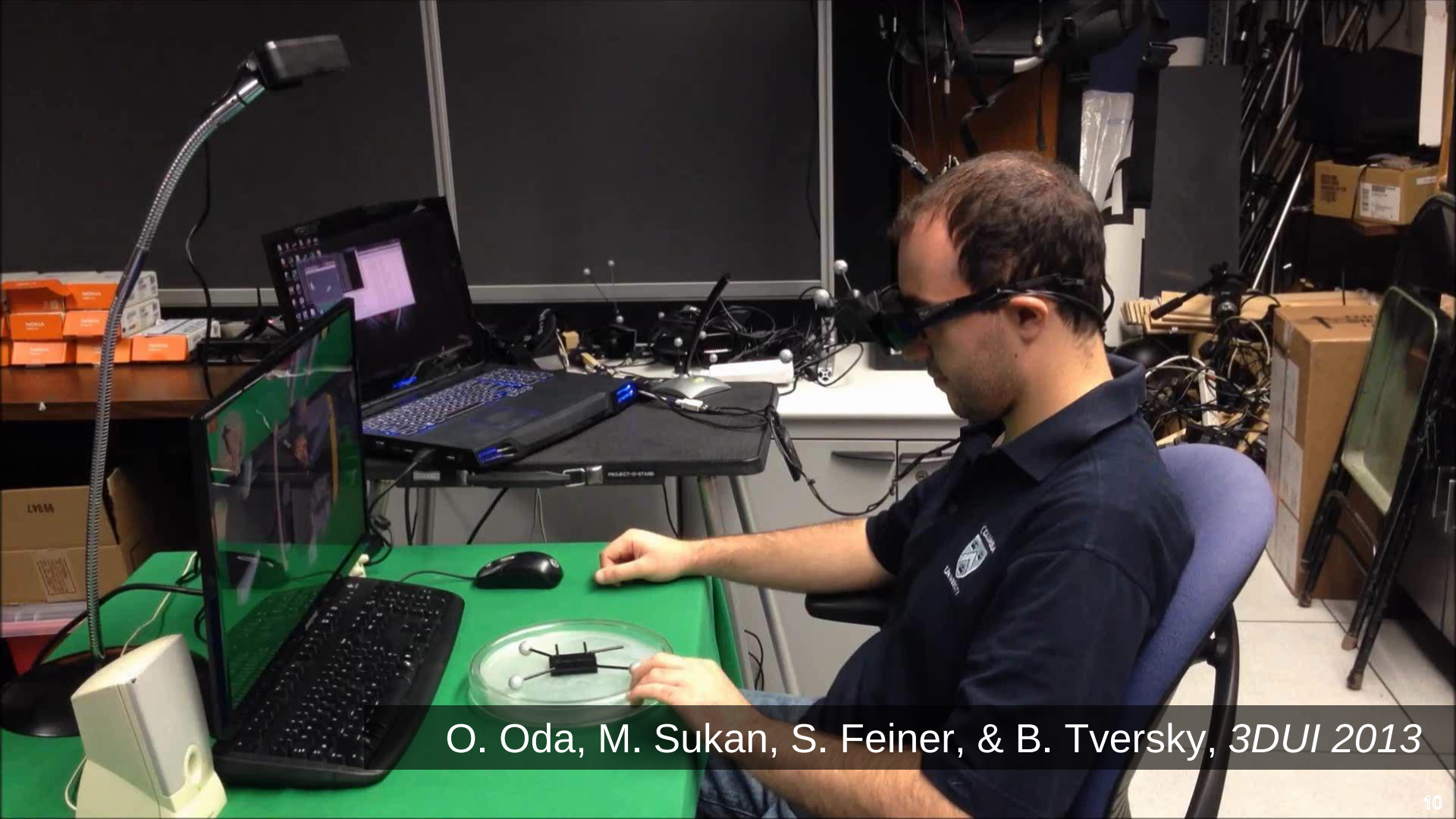
AR Remote Task Assistance

- Tasks
  - Get Tech to move to correct location
  - Get Tech to perform correct task

Getting the Tech in Place

Local Technician View

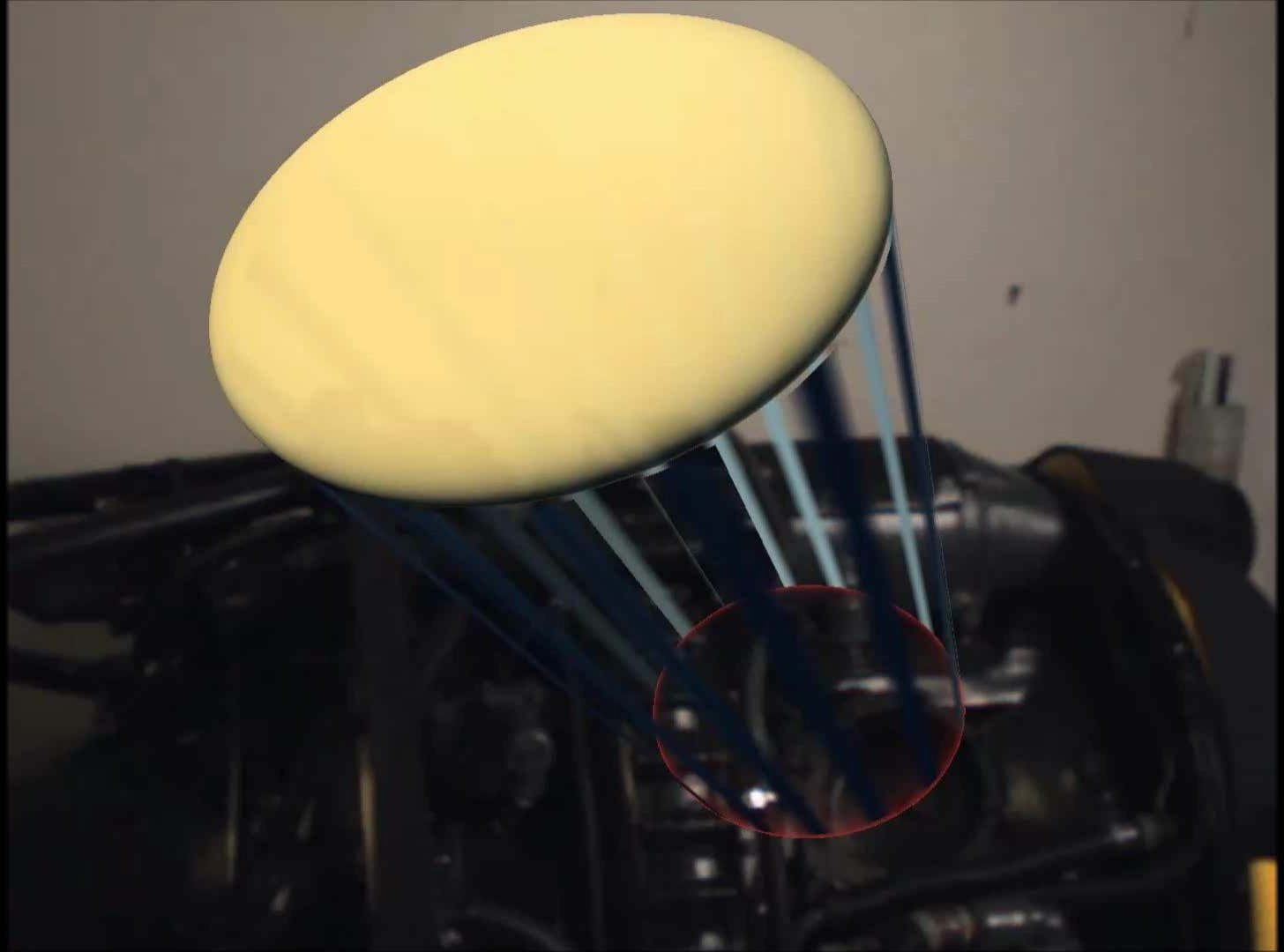
O. Oda, M. Sukan, S. Feiner, & B. Tversky, *3DUI 2013*


O. Oda, M. Sukan, S. Feiner, & B. Tversky, *3DUI 2013*

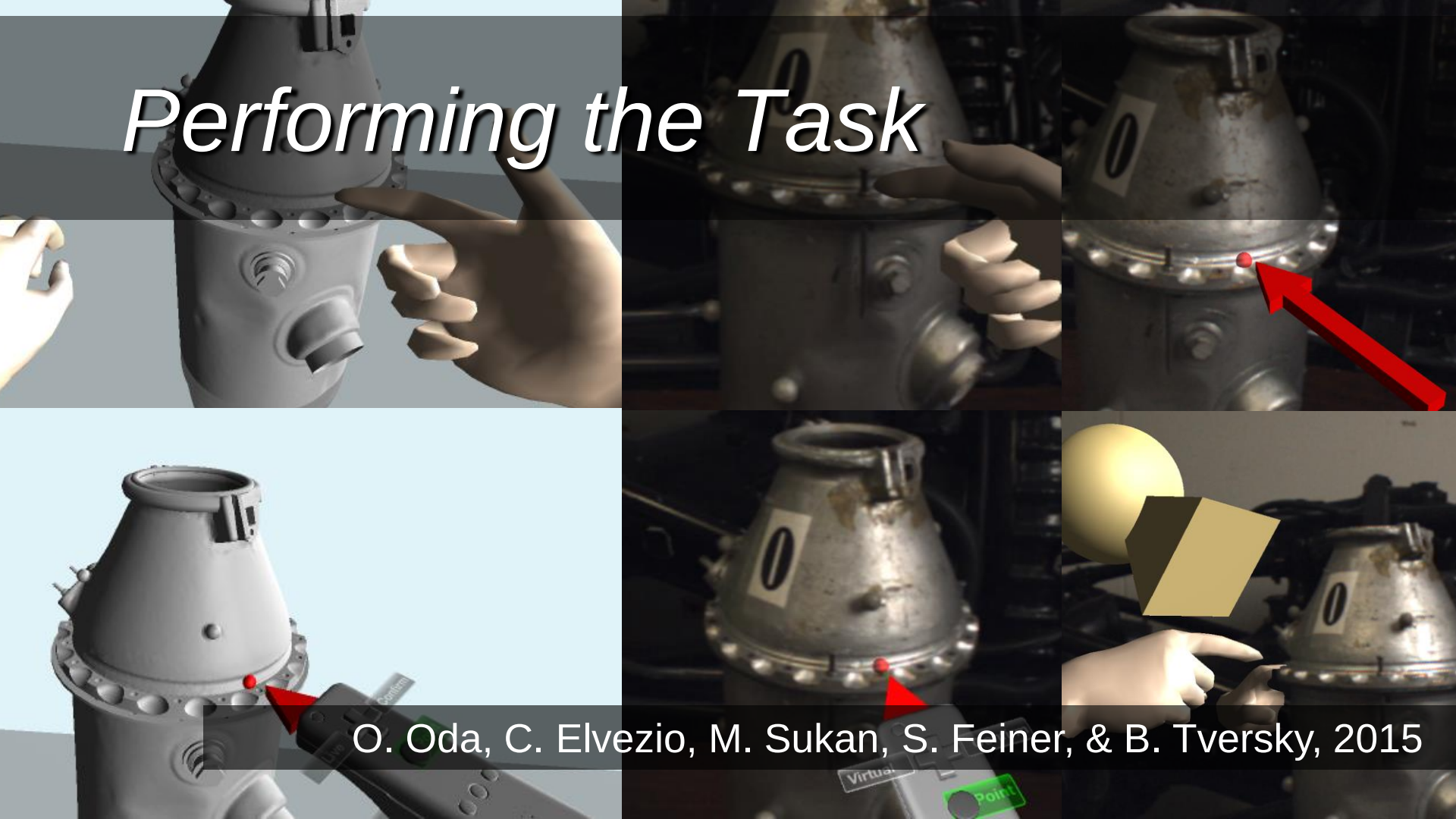
Getting the Tech in Place *ParaFrustum*

M. Sukan, C. Elvezio, O. Oda, S. Feiner, & B. Tversky, *UIST 2014*

Getting the Tech in Place *ParaFrustum*

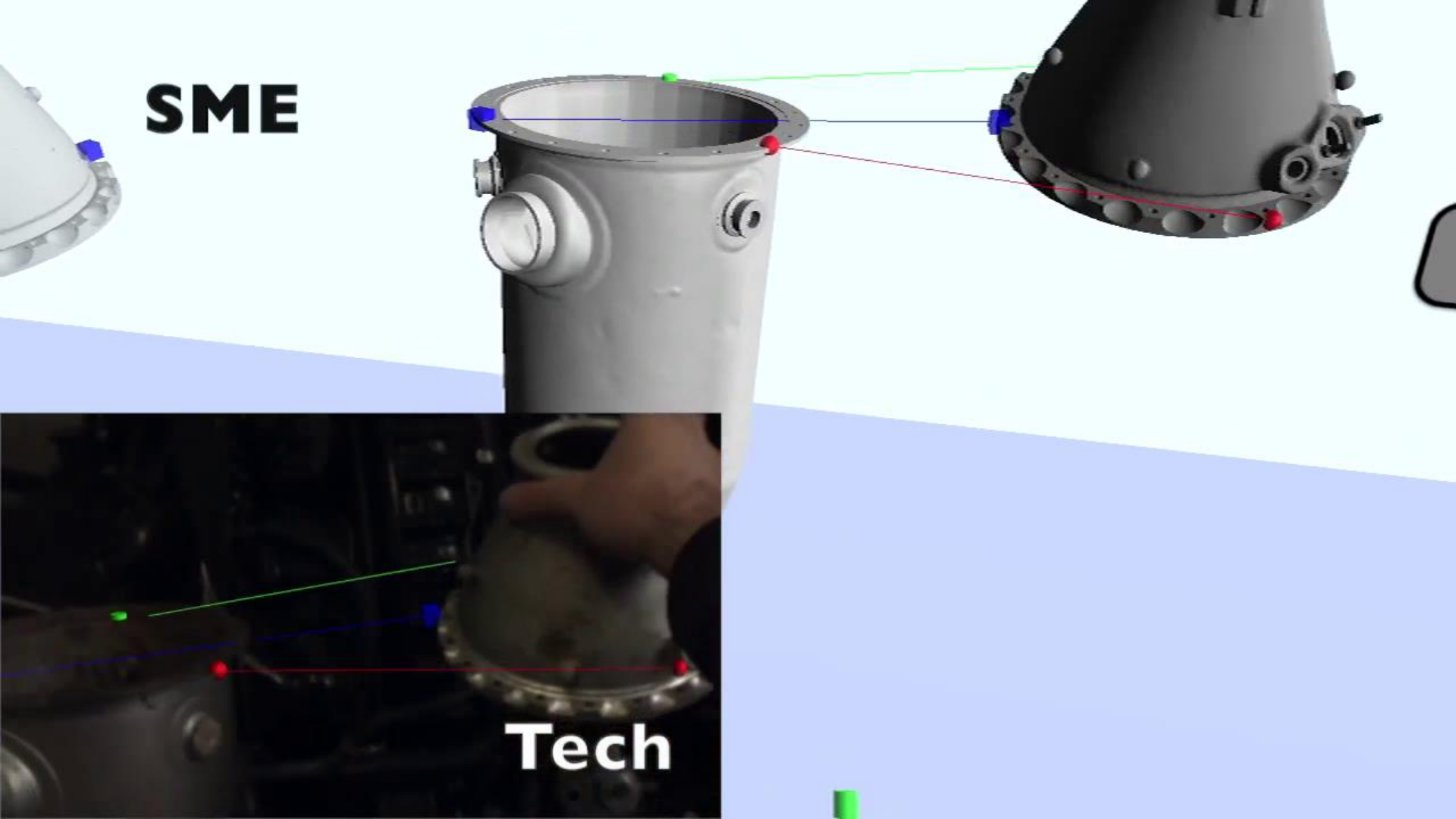


Performing the Task



O. Oda, C. Elvezio, M. Sukan, S. Feiner, & B. Tversky, 2015

O. Oda, C. Elvezio, M. Sukan, S. Feiner, & B. Tversky, 2015


SME
Tech

UI Design for AR

Multiple People

Multiple Viewpoints

Multiple Displays

Acknowledgments

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- Steve Henderson
- Ohan Oda
- Minhaz Palasara
- Mengu Sukan
- Barbara Tversky

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