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## WORKSHOP: TOWN HALL

# ASSEMBLING LARGE INFRASTRUCTURES IN SPACE USING INTELLIGENT ROBOTS

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<http://wvrtc.com/iros2023>



# Moderator Questions

How do we go from missions that aren't just cool demonstrations but also produce practical benefits?

How do we change the economics of doing things in space – not the \$1B project but the \$100 M project?

What should be the first major test of assembly of a large space structure?

What could you do with a robot servicer testbed in space to test construction and assembly?

These slides are transcriptions from notes taken by Craig Carignan and Giacomo Marani. Please feel free to report any inaccuracies or omissions.

# What are we ready to do now?



Glen H:

- Addressing the finances and policy questions are a lot harder than the technical work
  - commercial partnerships
  - policy decisions
  - identify the right opportunity for flight

Joseph B

- Large aperture space telescope can't be built on the ground
- What is the specific scientific outcome?
- What are we ready to do now?



# What can be done more cheaply?

Daniel H

- A lot is ready for us to do, but what are we *really* ready to do? (dollars, political will)
- What can we get through Congress?

Craig C

- Does it have to be a Congressionally-supported project?

Daniel H

- 100 m telescope would need Congressional support
- What could be done more cheaply?
- Rudra says a 3 m microwave antenna is a better candidate



# What should we fly next?

Joseph B

- microwave radar would have two units
- instead of formation flying, have them connected

Dan H

- connected interferometer might capture public's eye more than a telescope
- may not be priority of astrophysics community

Geordan G

- Gaia mission for gravity detection had a long truss structure with instruments

Joseph B

- science follows capabilities – don't always fund what scientists want



# What to build next?

Frank (NASA Ames)

- JWST has limitations
- Let's build a 100 m star shade (1 cm accuracy)
- occludes stars to see deeper into space
- nice, passive structure

Burton (NASA Langley)

- solar cell propulsion satellite (icarus had 14m x 14m array)

Craig C

- France was going to fly a large ring of mirrors in late 1980s to celebrate the Eiffel Tower Centennial (bigger than moon from Earth)



# How about space debris removal?

Giacomo M

- build large structures for space debris removal
- lots of push for space debris removal

Glen H

- there will never be a solution for space debris removal (<1m)
- the orbital mechanics are too costly
- LEO will eventually clean itself out if we stop adding to it now
- alternative is de-orbiting, but nobody wants to pay for removal

# Maybe build a space-based test platform?



Glen

- DARPA is probably done with space robotics for a while after RSGS
- NASA could launch a 10 m truss with its own comms, power
- basically like the ISS but without the human costs
- open it up to the public for payloads (robots, science instruments)

Daniel H

- maybe also use it for ARTEMIS demonstrations

Joseph

- Raise a challenge – can all instruments be nadir pointed? (can only point platform one way)





# Final push for flight

Kate M

- It's very hard to get a demo mission to fly

Daniel H

- We in this room can urge the right people to make the decisions

Glen

- UARS was one of the largest science satellites ever built
- Many instruments coexisted on same bus

Daniel H

- What if Bezos or Musk were offered a large payload volume?
- What would you do?