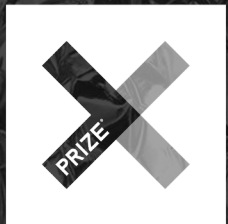


XPRIZE



XPRIZE
AVATAR



ICRA 2023
2nd WORKSHOP TOWARDS ROBOT AVATARS
JUNE 2, 2023



SHUICHI FUJIMURA
EXECUTIVE VICE PRESIDENT, INTERNATIONAL
ALLIANCES & PURCHASING, ANA
INNOVATION BOARD MEMBER



XPRIZE
VISIONEERS
2017 SUMMIT



ANA October 7, 2017
XPRIZE **\$22,000,000**
Twenty-Two Million and 00/100 Dollars
80-886-403680 ANA AVATAR XPRIZE

ANYWHERE IS POSSIBLE

WHY AN AVATAR XPRIZE?

ANA's business has always been to connect people, places and cultures. ANA wants to bring the ability to travel to more people and help to further bridge the gaps between us.

Avatar technology will bypass the barriers of distance and time to connect loved ones as well as more rapidly and efficiently distribute skills and hands-on expertise around the world.



ANA AVATAR XPRIZE

THE FUTURE OF TELEPRESENCE

\$10 Million USD Prize Purse

Four-year global competition

Focused on the development of a Robotic Avatar System that will transport an operator's senses, actions, and presence to a remote location in real time.



WHAT IS AN AVATAR SYSTEM?

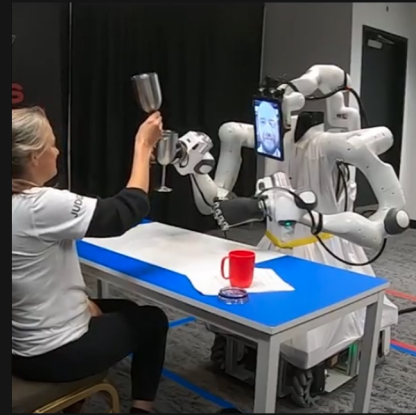
A physical Robotic Avatar that will transport an operators senses, actions, and presence to a remote location in real time, enabling the human operator to interact within a remote environment and feel as if they are truly there.



OPERATOR



OPERATOR VIEW



**RECIPIENT &
AVATAR**

HUMAN TO HUMAN

EXPANDING HUMAN CONNECTION

Avatars will provide the opportunity of human to human connection, even when you are at a distance.

ANYWHERE IS POSSIBLE

XPRIZE AVATAR | ANA

REMOTE, REAL-TIME EXPERTISE

TRANSFERRING SKILLS

Avatars will transport critical skills and expertise in real time to remote locations where they are needed.



ERASE THE BOUNDARIES

EXPLORATION

Avatars will allow humans to explore places otherwise too difficult, dangerous, or impossible to reach...and enable us to experience those places as if we were actually there ourselves.



COMPETITION TIMELINE

Prize Launched
99 Registered Teams
March 12, 2018

**37 Semifinalist Teams
Announced**
April 2021

**77 Qualified Teams
Announced**
January 8, 2020

**20 Finalist Teams
Announced**
May 2022

Semifinals Testing
September 2021

Finals Testing
November 4-5, 2022

Award Ceremony
November 5, 2022

ANA AVATAR XPRIZE TEAM SUMMARY

FINALIST PROGRESSION SINCE 2019



PRIZE ECOSYSTEM

JUDGING PANEL

A panel of global experts across the many facets of Avatar technology provided their expertise and leadership to help guide and judge the competition.

Judges served as the Operators of team's Avatar systems during testing.



Dr. Julie A. Adams



Josh Bankston



Bill Borgia



Allison Bushman



Dr. Ed Colgate



Dr. Thomas K. Ferris



Dr. Camila Françolin



Dr. Kelly S. Hale



Dr. Guy Hoffman



Dr. Serena Ivaldi



Andra Keay



Dr. Corinna Lathan



Justin Manley



Dr. Patrick McGarey



Dilip Patel



Dr. Jerry Pratt



Anthony Steed



Dr. Leila Takayama



Dr. Ryan L. Truby



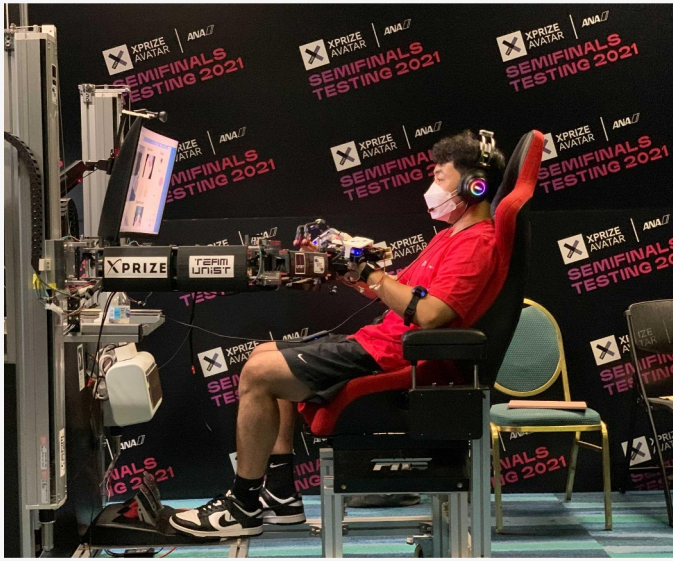
Nell Watson



Peggy Wu



Dr. Yasuyoshi Yokokohji



SEMIFINALS TESTING

SEPTEMBER 2021 | MIAMI, FL

- Tested a total of 29 Teams from 11 Countries
- Hosted a total of 145+ team members
- 17 Judges on site
- 188 Scored scenarios completed
- Plan #2 Testing conducted @ individual team labs

SCORING COMPONENTS

- **Operator Experience** – This is both the objective and subjective involvement of the Operator controlling the robotic Avatar, by which they feel a sense of actual Presence in the remote location.
- **Recipient Experience** – This refers to the experience of the person receiving the actions of the Operator via the robotic Avatar.
- **Avatar Ability** – This refers to the actual performance and capabilities of the robotic Avatar during testing.
- **Overall System Capability** – This term refers to the measure of the reliability of the system hardware, software, and any other elements, such as latency issues.

<i>Scenario</i>	<i>Operator Experience</i>	<i>Recipient Experience</i>	<i>Avatar Ability</i>	<i>Overall System</i>	<i>Total</i>
#1	12	8	6	4	30
#2	12	8	6	4	30
#3	12	8	6	4	30
Team Video	-	-	-	-	10
TOTAL					100

ANA AVATAR XPRIZE SEMIFINALS

INSIGHTS FROM SCORES OPERATOR

- 87% ■ I felt present in the remote space
- 92% ■ I was able to sense Recipient's emotion
- 86% ■ I was able to express my emotions
- 77% ■ I was able to clearly see and hear
- 54% ■ I was able to get tactile feedback
- 79% ■ I was able to sense my position
- 82% ■ I was able to move around
- 80% ■ I was able to manipulate objects
- 89% ■ I was able to gesture effectively
- 90% ■ I felt safe using the system
- 84% ■ I felt system was easy to use
- 84% ■ I felt system was comfortable to use

ANA AVATAR XPRIZE SEMIFINALS

INSIGHTS FROM SCORES AVATAR ABILITY

- 87% ■ **Scenario 1 - Task 3:** Was the Operator/Avatar able to **place** a puzzle piece while verbally identifying the image on the piece?
- 73% ■ **Scenario 2 - Task 6:** Was the Operator/Avatar able to **maneuver** away from the table to a marked, designated area?
- 73% ■ **Scenario 3 - Task 4:** Was the Operator/Avatar able to **describe the texture** they felt?
- 67% ■ **Scenario 3 - Task 5:** Was the Operator/Avatar able to pick up the artifact and **describe its weight**?
- 67% ■ **Scenario 3 - Task 6:** Was the Operator/Avatar able to **maneuver** away from the table to a marked, designated area?

SEMIFINALS TESTING LEADERBOARD

Rank	Team Name	Country	Tested in Miami	Tested at Lab	Dropped from Competition
1	NimbRo	Germany	X		
2	iCub	Italy		X	
3	iBotics	Netherlands		X	
4	Team Northeastern	United States	X		
5	Dragon Tree Labs	Singapore	X		
6	AVATRINA	United States	X		
7	Avatar-Hubo	United States	X		
8	Tangible	United States	X		
9	AlterEgo	Italy		X	
10	*Cyberselves	United Kingdom	X		
11	Team SNU	South Korea	X		
12	Pollen Robotics	France	X		
13	Last Mile	Japan	X		
14	Enzo	Colombia		X	X
15	Team UNIST	South Korea	X		
16	Inbiodroid	Mexico	X		
17	Rezillient	United States	X		X
18	*Touchlab	United Kingdom	X		
19	AvaDynamics	United States	X		
20	Janus	France/Japan		X	

*Merged Team



**XPRIZE
AVATAR**

ANA

FINALS EVENT 2022

NOVEMBER 04 - 05, 2022

LONG BEACH CONVENTION CENTER



Sign up to learn more:
avatar.xprize.org





COURSE DESCRIPTION

XPRIZE
AVATAR

ANA //

1 THE OPERATOR



1 THE AVATAR



2 3 MISSION COMMUNICATION



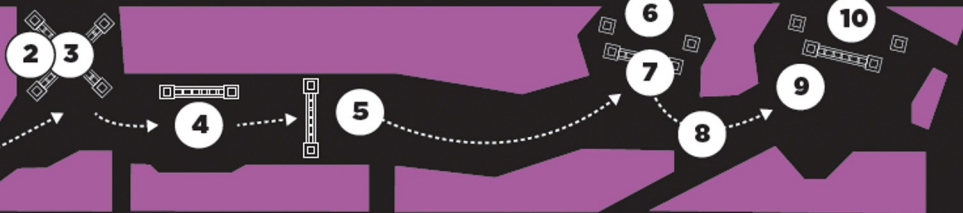
6 BATTERY CANNISTER



7 CANNISTER PLUG-IN



9 DRILL



5 PLANET CROSSING



8 CLOSE NAVIGATION



10 PLANET ROCK COLLECT



4 STATION HATCH DOOR SWITCH



TEST COURSE STORYLINE

THE COMPETITION IS A MISSION!

Avatars have been sent on a mission to Planet X on a mission to discover the elusive “Energy Abundance Rocks” on Planet X teams will compete on a course that simulates a space mission on ‘Planet X’! The Avatar Robot has been sent to save “Planet X” by successfully navigating the complex environment and locating the elusive abundance rock.

The Finals Test Course consists of ten tasks that reflect the competition's three core domains:

- *Connectivity (human to human connection)*
- *Exploration (the new era of travel)*
- *Skill Transfer (expertise with no boundaries)*

Task 1: An Operator remotely connects to the Avatar robot, and maneuvers to the mission control desk. *Testing: basic mobility*

Task 2: The Avatar reports to the Mission Commander and introduces themselves. *Testing: audio and video*

Task 3: The Avatar receives the mission details and confirms them with the Mission Commander. *Testing: audio and video*

Task 4: The Avatar activates a switch which opens the station door. *Testing: grasping*

Task 5: The Avatar exits the mission control room through the door and travels across the planet to the next task. *Testing: advanced mobility*

Task 6: The Avatar must identify the full battery canisters that are among empty canisters. *Testing: ability to identify weight*

Task 7: The Avatar places the correct canister into the designated slot which triggers the lighting of the next task zone. *Testing: manipulation*

Task 8: The Avatar navigates along the planet’s surface to arrive at the next task. *Testing: navigation and mobility*

Task 9: The Avatar must use the drill to remove the door. *Testing: advanced manipulation*

Task 10: The Avatar must reach through the barrier to identify the rough textured rock and retrieve it. *Testing: haptics*

ANA AVATAR XPRIZE

SCORING COMPONENTS

- **Avatar Ability** – This refers to the actual performance and capabilities of the robotic Avatar during testing.
 - 10 Tasks, Pass/Fail
- **Operator Experience** – This is both the objective and subjective involvement of the Operator controlling the robotic Avatar, by which they feel a sense of actual Presence in the remote location.
 - 3 Questions
- **Recipient Experience** – This refers to the experience of the person receiving the actions of the Operator via the robotic Avatar.
 - 2 Questions

	Connectivity Tasks	Exploration Tasks	Skills Transfer Tasks	Operator Experience	Recipient Experience	Total
<i>Test Slot</i>	<i>4 points</i>	<i>3 points</i>	<i>3 points</i>	<i>3 points</i>	<i>2 points</i>	<i>15 points</i>

FINALS TESTING

TEST COURSE DESIGN



FINALS TESTING

TEST COURSE



Displays should be interactive and/or dynamic, allowing the public to wear, touch or see technologies in action.

FINALS AWARD CEREMONY

THE \$8M AWARD

TEAM NIMBRO: \$5M

POLLEN: \$2M

NORTHEASTERN: \$1M



RESULTS

RANK	TEAM	POINTS				
		RUNS COMPLETED	TIME ON COURSE	TASK	JUDGED	TOTAL
1	NIMBRO	2	05:50	10	5	15
2	POLLEN ROBOTICS	2	10:50	10	5	15
3	TEAM NORTHEASTERN	2	21:09	10	4.5	14.5
4	AVATRINA	2	24:47	10	4.5	14.5
5	IBOTICS	2	25:00	9	5	14
6	TEAM UNIST	2	25:00	9	4.5	13.5
7	INBIODROID	2	25:00	8	5	13
8	TEAM SNU	2	25:00	8	4.5	12.5
9	ALTEREGO	2	25:00	8	4.5	12.5
10	DRAGON TREE LABS	2	25:00	7	4	11
11	AVATAR HUBO	2	25:00	6	3.5	9.5
12	LAST MILE	2	25:00	5	4	9
13	AVADYNAMICS	1	25:00	4	4	8
14	ICUB	1	25:00	4	3	7
15	TANGIBLE	1	25:00	3	4	7
16	CYBERSELVES TOUCHLAB	1	25:00	4	3	7
17	JANUS	0	N/A	N/A	N/A	N/A

THANK YOU!

david@xprize.org