Adaptation of CSA's Canadarm Comparative Table

Canadarm The first Canadian robotic arm to go to space	
Location	Installed on each Space Shuttle and returned to Earth. Now retired, the Canadarm is on display at the Canada Aviation and Space Museum in Ottawa, Ontario.
Range of motion	Reach limited to length of arm.
Degrees of freedom	Six degrees of freedom. Similar to a human arm: · Two joints in the shoulder · One joint in the elbow · Three joints in the wrist
Joint rotation	Elbow rotation limited to 160 degrees.

Adaptation of CSA's Canadarm Comparative Table

Senses	No sense of touch.
Length	15 m
Speed of operation *note: cm/s is centimetres per second	· Unloaded: 60 cm/s · Loaded: 6 cm/s
Repairs	Repaired on Earth.
Control	Controlled by astronauts on the Space Shuttle.
Cameras	Two cameras: · One on the elbow · One on the wrist

Adaptation of CSA's Canadarm Comparative Table

Canadarm2 Servicing the International Space Station since 2001	
Location	Stays permanently in space on board the International Space Station.
Range of motion	Moves end-over-end to reach many parts of the International Space Station, where its anchoring "hand" plugs into a power, data, and video outlet. Because it is mounted on the Mobile Base, the arm can travel the entire length of the Space Station.
Degrees of freedom	Seven degrees of freedom. Very similar to a human arm: · Three joints in the shoulder · One joint in the elbow · Three joints in the wrist
Joint rotation	Each of Canadarm2's joints rotate 270 degrees in each direction, a total of 540 degrees. This range of motion is greater than that of a human arm.

Adaptation of CSA's Canadarm Comparative Table

Senses	· Force-moment sensors provide a sense of "touch". · Automatic collision avoidance.
Length	17 m
Speed of operation *note: cm/s is centimetres per second	· Unloaded: 37 cm/s · Loaded: 2 cm/s (during ground control) 15 cm/s (support during spacewalks)
Repairs	Designed to be repaired in space. Composed of removable sections that can be individually replaced in space.
Control	Controlled from the ground or by astronauts on the International Space Station.
Cameras	Four colour cameras: · One on each side of the elbow · The other two on the "hands"

Adaptation of CSA's Canadarm Comparative Table

Canadarm3 An artificial intelligence-based robotic system designed for the Lunar Gateway	
Location	Will stay permanently in space on board the Lunar Gateway.
Range of motion	Will move end-over-end to reach many parts of the Lunar Gateway, where its anchoring "hand" will plug into a power, data, and video outlet. The arm will be able to travel and bring tools to the entire length of the Lunar Gateway.
Degrees of freedom	Seven degrees of freedom. Very similar to a human arm: · Three joints in the shoulder · One joint in the elbow · Three joints in the wrist
Joint rotation	Each joint will be able to rotate almost 360 degrees.

Adaptation of CSA's Canadarm Comparative Table

Senses	· Force-moment sensors provide a sense of "touch". · Automatic collision avoidance. · 3D Vision Sensor Tool that maps objects around it.
Length	8.5 m
Speed of operation *note: cm/s is centimetres per second	· Unloaded: 10 cm/s · Loaded: to be determined
Repairs	Designed to self-detach sections that can be repaired inside the Lunar Gateway.
Control	Primarily controlled autonomously. Can also be controlled from the ground or by astronauts on the Lunar Gateway.
Cameras	Six colour 4K cameras: · One 360-degree camera on each side of the elbow · One on each boom on swivel mounts · The other two on the "hands"