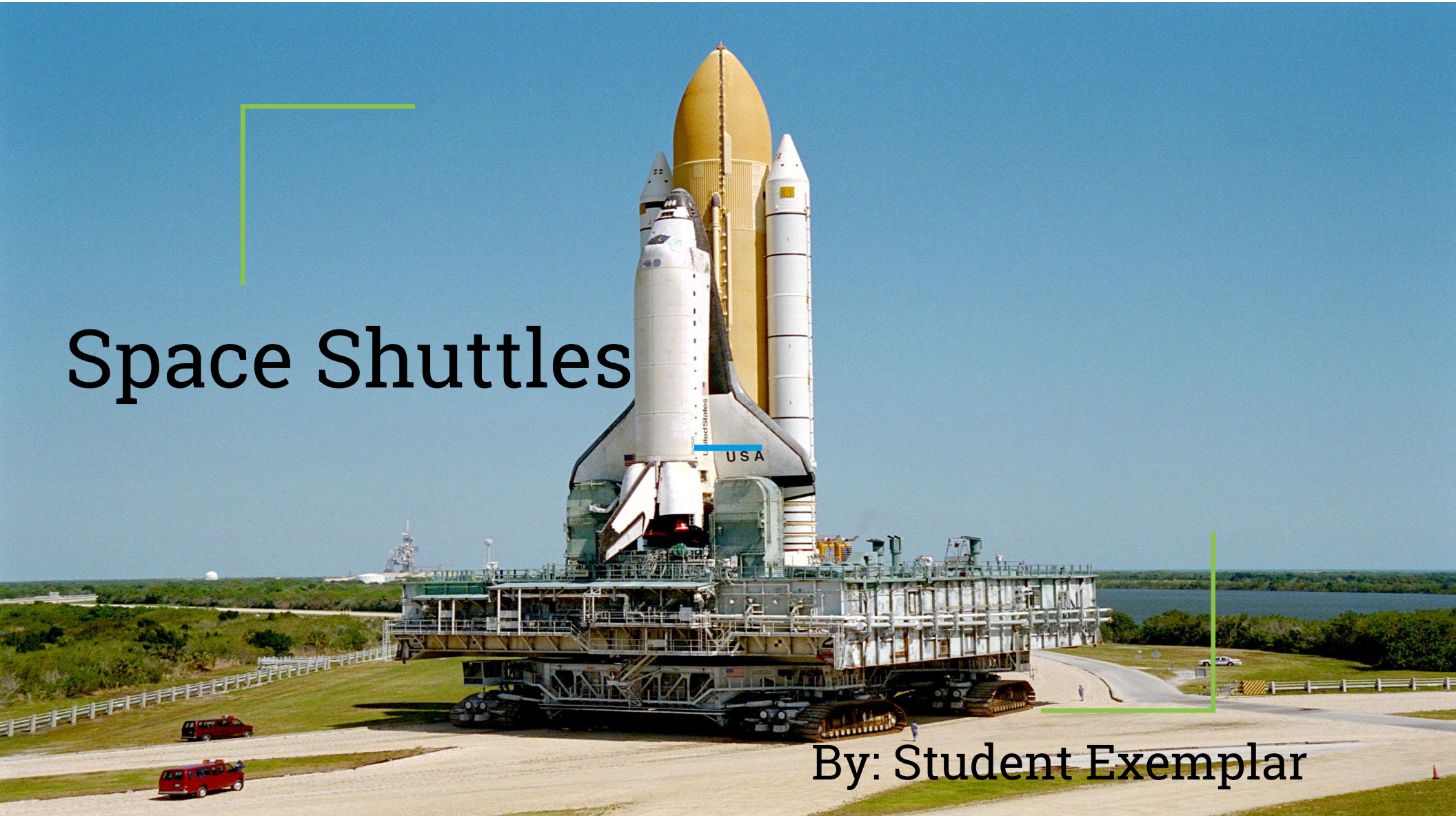


Space Shuttles

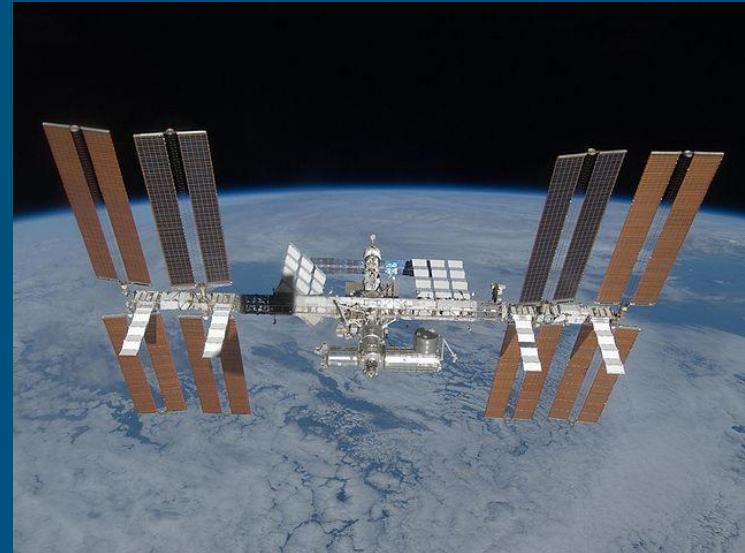
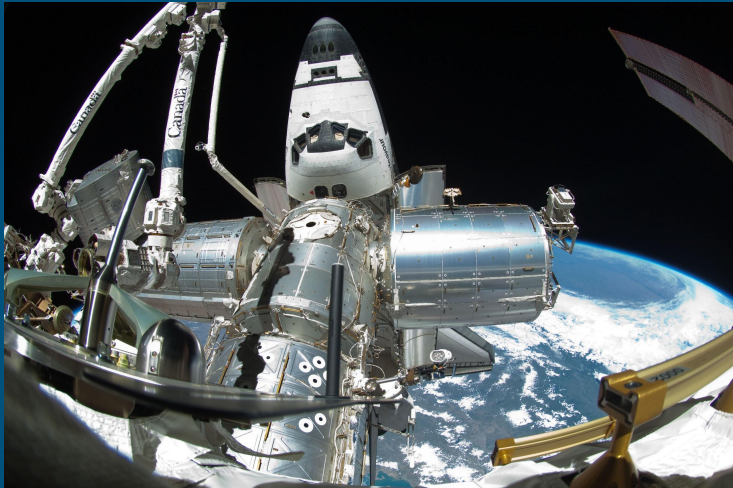


By: Student Exemplar

The benefits of the space shuttle program 1981-2011

- Provided a reusable vehicle that transports humans and items to space.
- Provided a place to conduct research in space prior to the establishment of the International Space Station.
- Used to conduct repairs to the hubble telescope.

These shuttles also assisted in the construction of the ISS. Shortly after their role as construction aids and platforms they became the transporters of supplies to the space station until the program was shut down in 2011.

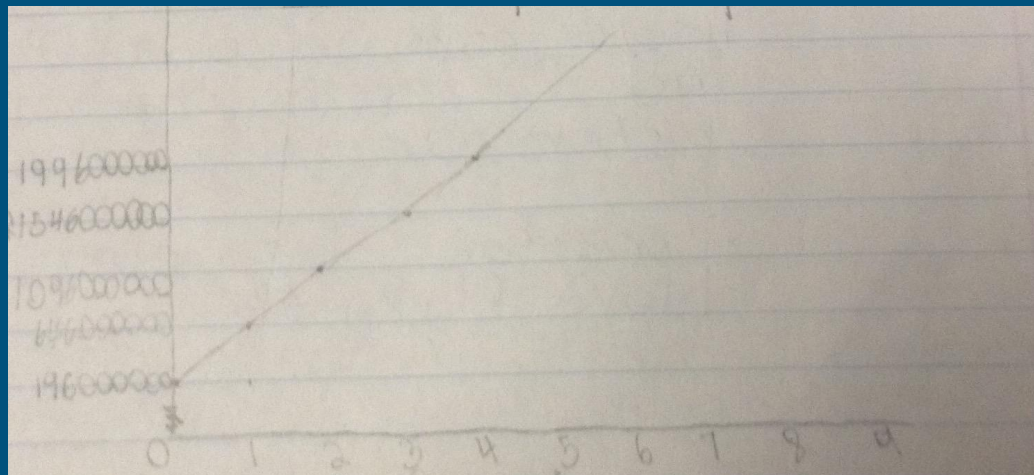


The total cost of the space shuttle program was 209 billion dollars

To build a space shuttle it cost around 196 million dollars however to launch and maintain it cost 450 million for each launch.

Cost of Space Shuttle Missions

Cost(\$)



Number of Missions

Canadian Contributions



The canadarm was one of our largest contributions to the space shuttle program, this robotic arm was used as a crane and many other construction tools during the ISS's construction.

The canadarm was found on the shuttle columbia, it made its debut on November 13, 1981

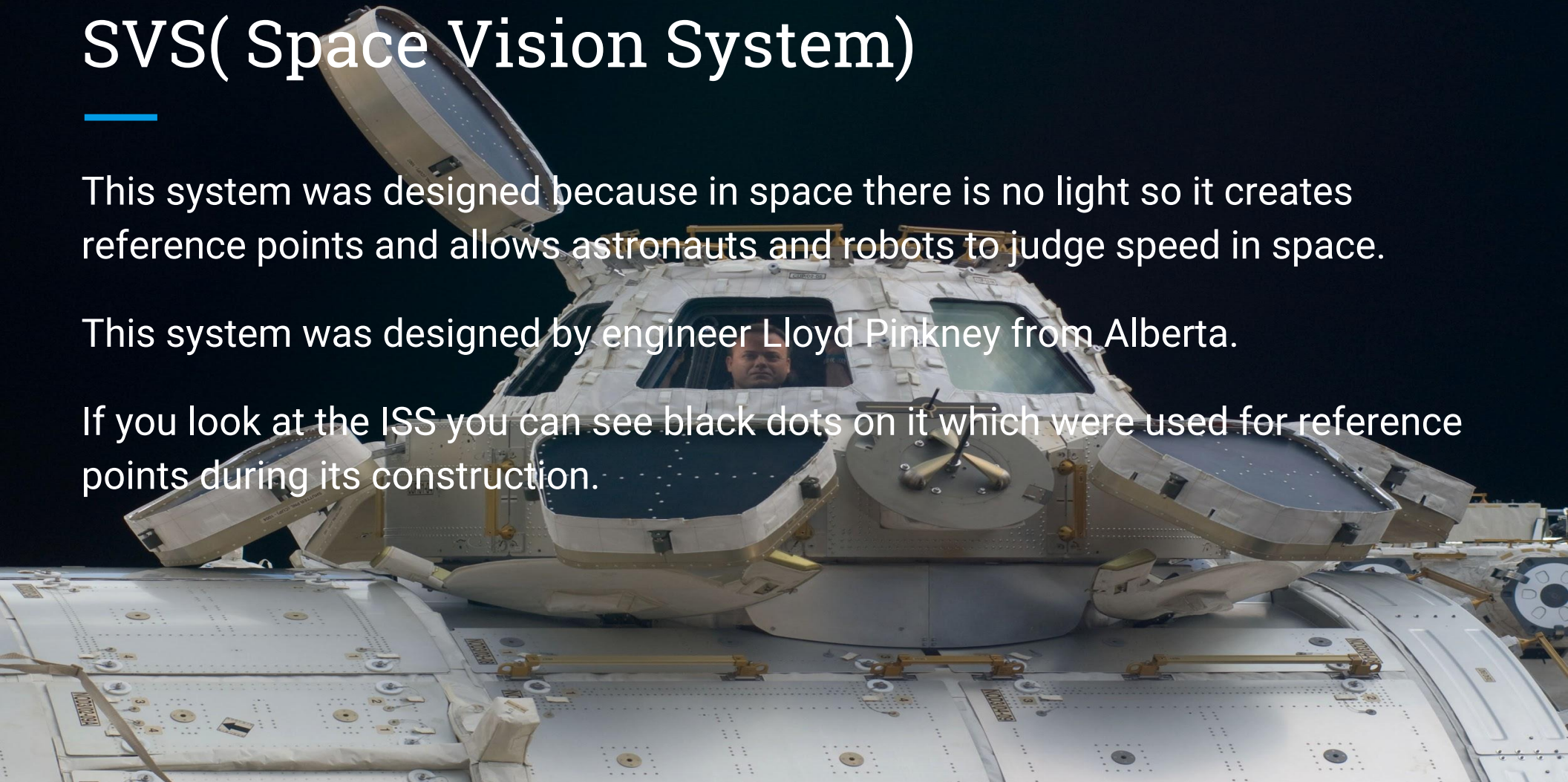
This arm was the predecessor of the Image Guided Autonomous Robot which is used for diagnosing and treating breast cancer patients.

SVS(Space Vision System)

This system was designed because in space there is no light so it creates reference points and allows astronauts and robots to judge speed in space.

This system was designed by engineer Lloyd Pinkney from Alberta.

If you look at the ISS you can see black dots on it which were used for reference points during its construction.



Canadian Astronauts in the Space Shuttle Program

1984 Oct. 5-13, Astronaut Marc Garneau becomes the first Canadian in space on mission on board Challenger.

1992 Jan. 22-30, Astronaut Roberta Bondar was on board Discovery

1992 Oct. 22, Steve MacLean was an astronaut in space on mission STS-52.

1994 July 8, Canadian astronaut Marc Garneau becomes Capsule Communicator for mission STS-65 at Mission Control in Houston.

1996

May 19 Marc Garneau flies in space on mission STS-77.

June 20 Bob Thirsk acts as Canadian astronaut, as a Payload Specialist on mission STS-78.

1999 May 27, Julie Payette becomes the eighth Canadian astronaut in space and the first one to board the space station on mission STS-96/2A.1.

2001 April 19, Chris Hadfield becomes the first Canadian to perform a spacewalk to deliver Canadarm2 to the International Space Station.

Risks

- The challenger shuttle disaster on launch was caused by an explosion of the hydrogen gas tank and booster.
- The columbia shuttle disaster on re-entry into the atmosphere because of failure to the heat shields.



Risks

Astronaut health impacts of zero gravity like muscle deterioration and heart atrophy.

A flat tire or brake failure during landing.

Faulty navigational system could cause collision between the space shuttle and a satellite or even the space station

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