

2011 Problem

High School Mathematical Contest in Modeling (HiMCM)

Problem A: Space Shuttle Problem: No More Space Shuttles

On July 21, 2011, the 135th and final US Space Shuttle landed in Florida after its 13-day mission into orbit, complete with a docking at the International Space Station (ISS). NASA will now have to rely on other nations or commercial endeavors to travel into space until a replacement vehicle is developed and constructed. Develop a comprehensive ten-year plan complete with costs, payloads, and flight schedules to maintain the ISS.

Some interesting facts possibly worthy of your consideration:

- The ISS is at full capacity with 6 astronauts, but can surge during shuttle docks to as high as 13.
- The ISS is scheduled to remain in service until at least the year 2020.
- Historically, transport to the ISS using US Shuttles has cost between \$5000-10,000 per pound. Shuttle missions have lasted approximately 10-14 days in orbit. Missions on board the ISS typically last around six months.
- Recently, progress has been made within private industry to launch unmanned rockets into space.
- Russia is willing to launch US astronauts into space at a cost of about \$60 million each.