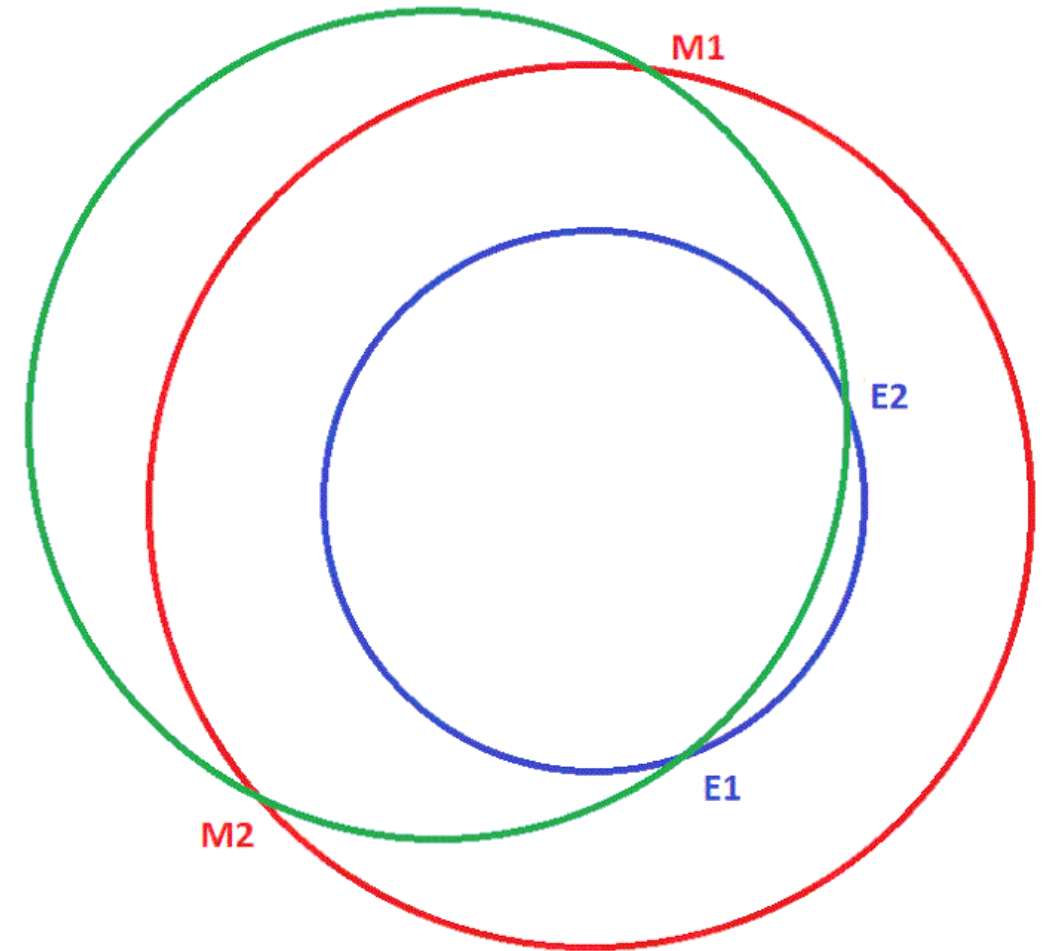


The Aldrin Cycller

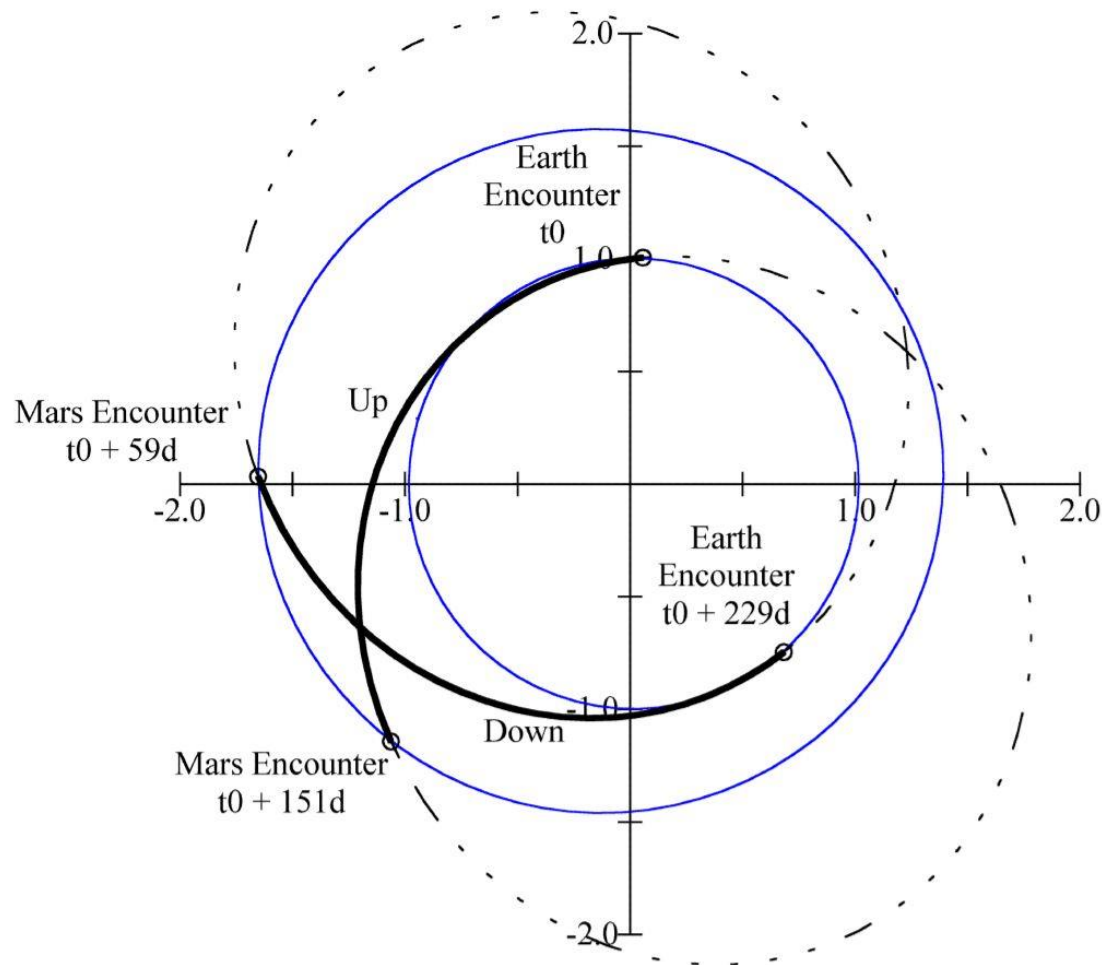
Ethan MacDonald

What's a Cyclor?

- Spacecraft that repeatedly encounter the same planets on a regular schedule
- Don't encounter the planets on every orbit, just when the timing is right
- For a Earth – Mars cyclor, that's about every two years
- Require very small adjustment burns on the order of years to maintain their trajectory
- Three kinds: Ballistic, Powered, Semi-Cyclor



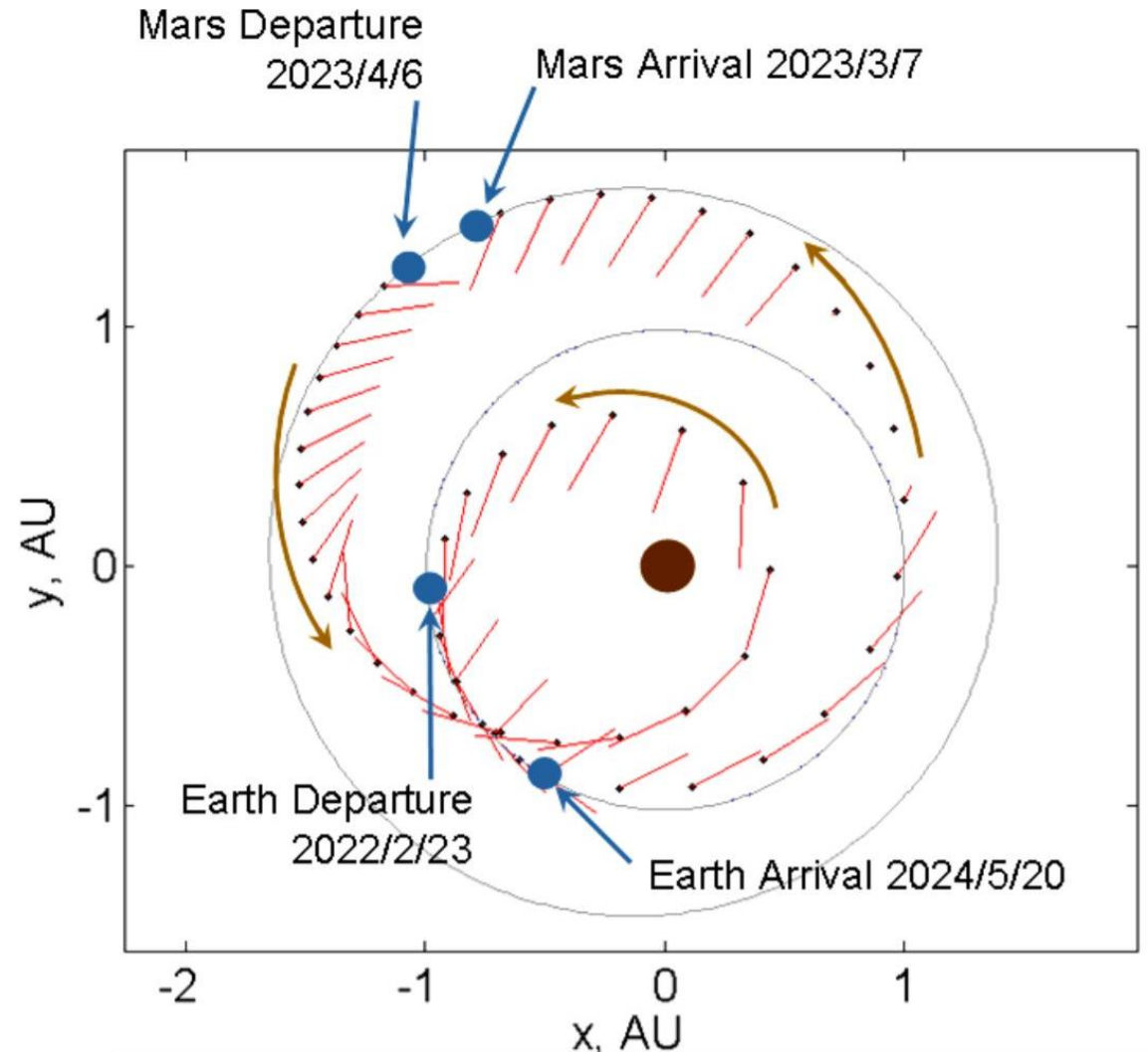
The Aldrin Cyclers



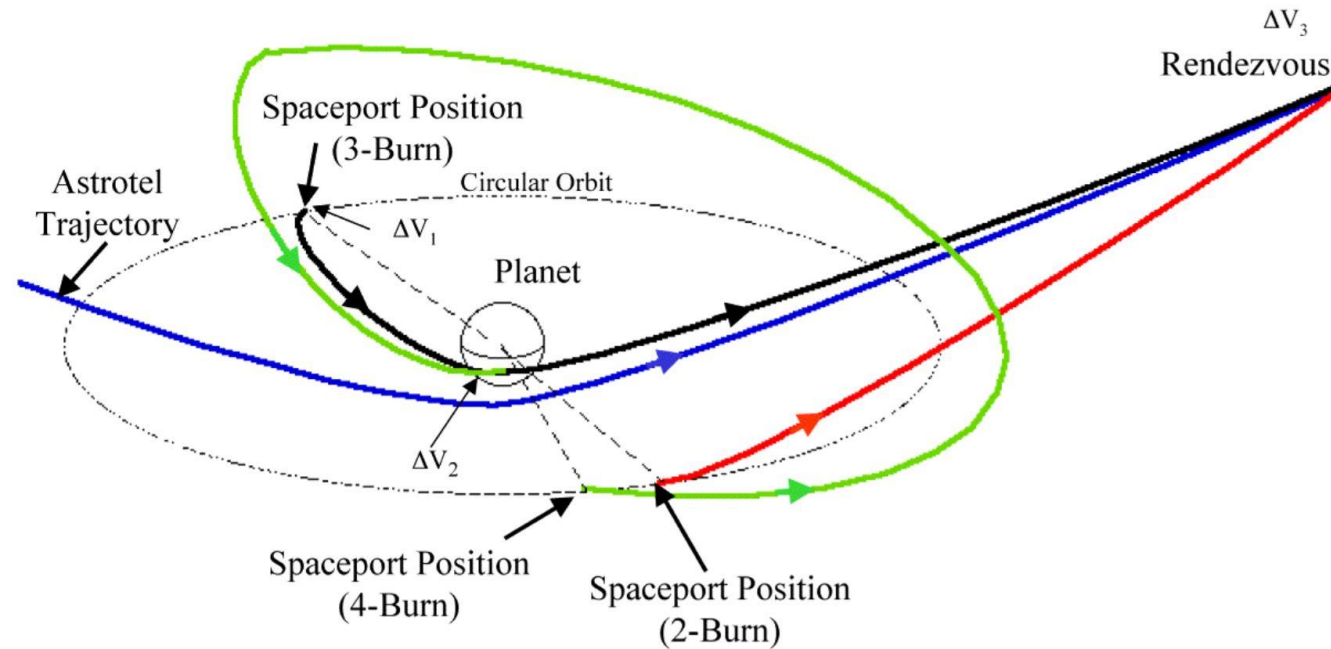
- First proposed by Buzz Aldrin in 1985
- Two ballistic cyclers following mirroring trajectories
- Up and Down “Escalators” for transport to and from Mars
- 5 months in interplanetary space during each transfer between the Earth and Mars
- Each cycler spends 21 months unoccupied between trips

Powered Aldrin Cyclers Variant

- Ballistic cyclers have a large flaw: interplanetary velocities
- Powered Cyclers would utilize continuous low-thrust propulsion like ion engines or solar/magnetic sails
- Ballistic velocities arriving at Mars:
 - 11 km/s for the Up Escalator
 - 6 km/s for the Down Escalator
- Powered velocities arriving at Mars:
 - 5 km/s for Up Escalator
 - 5 km/s for Down Escalator



Challenges to an Aldrin Cyclers System



- One chance every two year to get the rendezvous right
- Few back-up options if the rendezvous fails
- On-orbit construction of cyclers
- Securing funding for two cyclers
- Establishing the initial cycler trajectories

Any Questions?