

The background is a dark space scene. On the left, a large, detailed Earth is visible. In the center and right, several small satellite models are scattered, some connected by thin lines. A large, textured grey asteroid is prominent in the lower center. The overall tone is dark and futuristic.

CONNECT

...

Cooperative Node Network Command Test
Patrick Anselmo Donovan, E.I.T. - Space Cooperative, Inc.

Today's Presentation

The background features a dark space scene with a large, detailed Earth in the upper left. In the center, a large, irregularly shaped grey asteroid is the focal point. Several small, rectangular spacecraft with solar panels are positioned around the asteroid, some appearing to be in orbit or approaching. The overall aesthetic is futuristic and scientific.

1. Our Mission

2. Current Progress

3. Next Steps

4. Q & A



“Going to Space, Together.”

SPACE COOP

How will it work?



Our goals:

reduces cost

lowers barriers to entry

promotes user-friendliness

enables new types of missions

supports existing community

Affordability

Preaching to the choir, a.k.a.

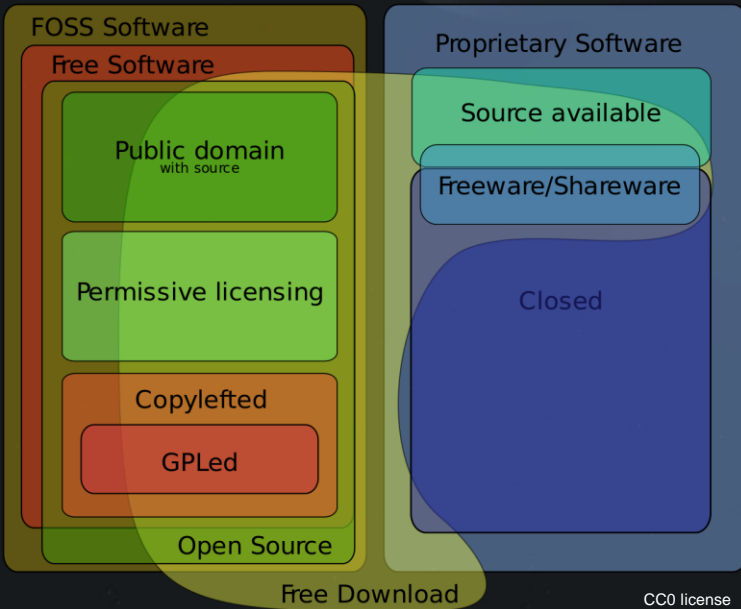


Lowering Barriers to Entry

Open-source licensing

Code publication

Collaborative design on our (in development) Platform



SPACE
COOP

Lowering Barriers to Entry - with our Platform

SPACE COP MISSIONS PEOPLE

GOING TO SPACE, TOGETHER.

Most of us dream of a future where Earth is a better place and where we have traveled outside our solar system. We are creating a social collaboration platform where we can work on these shared dreams together.

Mars

If we develop technological solutions that enable us to become a multi-planetary species and settle on Mars, we will then in parallel have breakthrough innovations for life and survivability on Earth.

120,132

Projects

Let's rethink how to build homes on Mars. Designing elegant, large scale, hemispherical architectures can challenge both engineers and artists alike.

SPACE COP MISSIONS PEOPLE

MARS

120,132

enable us to become a multi-planetary species and settle on Earth through innovations for life and survivability on Earth.

Documents

Upcoming Dates

- Weekly Meeting JAN 20
- Mission Concept Review JAN 23

Documents

- Trade Studies
- Budget

Crew

40

Participating Missions

- Earth**
Planets in space too, and we must do all we can to ensure energy on our home planet.
2,241
- Mars**
If we develop technological solutions that enable us to become a multi-planetary species, we will then in parallel have breakthrough innovations for life and survivability on Earth.
1,502
- Europa**
Europa is the sixth of the four Galilean moons orbiting Jupiter, and the sixth-closest to the planet.
340

SPACE COP MISSIONS PEOPLE

Patrick Donovan

Senior Staff Engineer @ Tuscher Engineering Group

Bachelor of Science, Civil Engineering - UCLA (2015)

Activity

- Publications Discussions
- The Role of Mars Analogous environments on Earth in the interpretation of data from the past, present and future missions
- Micro-propulsion based on vacuum arcs: Accessible technologies for CubeSat missions
- Experimental research of radio-frequency ion thruster
- Discharge and physical characteristics of an ablative liquid-fed pulsed plasma thruster for small satellites
- Analysis of a Moon outpost for Mars enabling technologies through a Virtual Reality environment
- Orbit Design for the Martian Moon Impact Mission
- Recent Developments for Asteroid Surface Exploration Rovers
- Possible Mars Exploration Architectures

Load More



Flickr user kevint3141, 19 July 2009



COOP

Ease of Use

To transform mission control from this...



...to this



Enabling New Mission Types

Inspections

Prospecting

Support

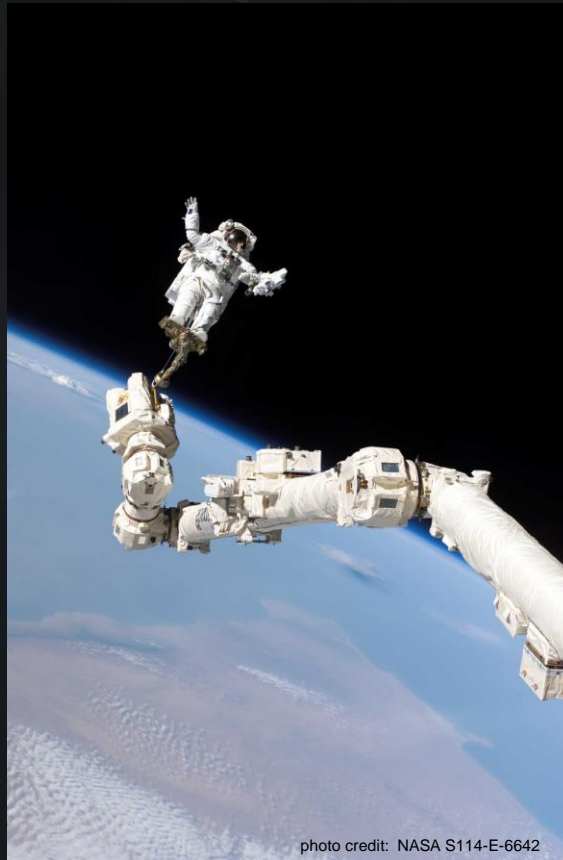
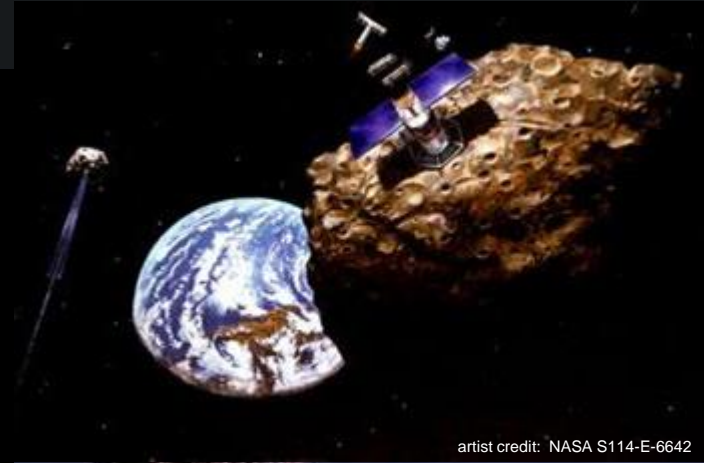


photo credit: NASA S114-E-6642



artist credit: NASA S114-E-6642



artist credit: NASA

Supporting Existing Community

Enthusiasts &
students



Scientists &
other professionals





Current Progress

Step 1: Simulate

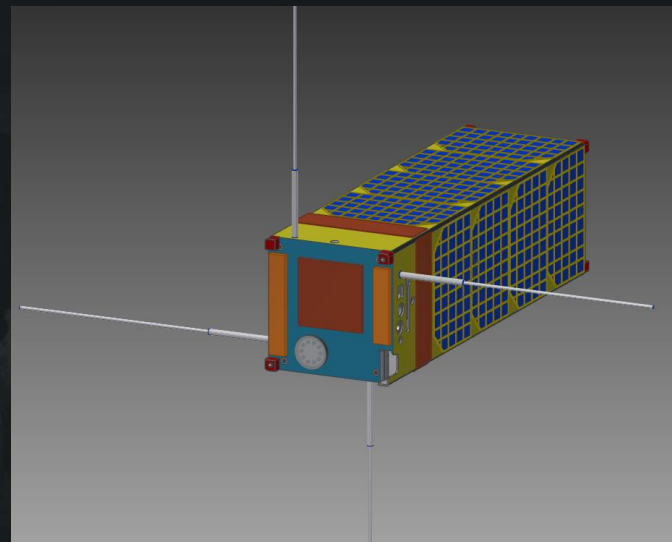
Physics: Anaconda distribution of Python 2.7

Models: Autodesk Inventor

Animation: Unity

Data Output: csv

```
def dodge(Ship, satList, satAtts, targetID, t_step):  
    evasionVector = dodge_vector(Ship.attitude,  
                                 (Ship.pos -  
                                 satList[targetID].pos))  
  
    Ship.reorienting(t_step, evasionVector)  
    satAtts[Ship.ident, :] = Ship.attitude  
    if closely_aligned(Ship.attitude, evasionVector):  
        Ship.thrust_state = True  
        Ship.burning(t_step)
```



Fundamental Swarm Rules

Collision avoidance

Maximum swarm diameter

Minimum allowable swarm distance



Physics: Hill-Clohessy-Wiltshire

The background of the slide features a dark space scene. On the left, a large, detailed Earth is visible. In the center and right, there are several 3D models of satellites and a large, irregularly shaped asteroid. The overall aesthetic is technical and space-themed.

Pros:

1. Conceptually simpler
2. Faster computation
3. Local linearity
4. Flexible to future perturbation models

Cons:

1. Long-term error
2. Limited to operations in gravity wells

Step 2: Estimate

Assume: all current COTS hardware and software

Primary focus on:

Movement

propulsion

attitude control

Communications

inter-drone

ranging/ remote sensing

Command input

Step 3: Iterate



Step 4: Grow

Are you passionate about living in space and cooperation? The following experts are highest in demand for our immediate trajectory:

Space Mission Engineers

Software Developers

Interaction Designers

ITAR Compliance

Please talk with me afterwards, email curious@space.coop, or visit www.space.coop/membership for more details!

A Special Thanks To:



Yalda Mousavinia
research



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coding



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visuals & coding



Dennis Foley
coding



Srinath
Ravichandran
research

Fellow Space Co-op Team Members



Q & A