

Solar Panel Deployment Mechanical

Status and questions

Step 1 - Identify available digital assets

Status Update May 18, 2022

Vincent Risalvato - KD4YJB

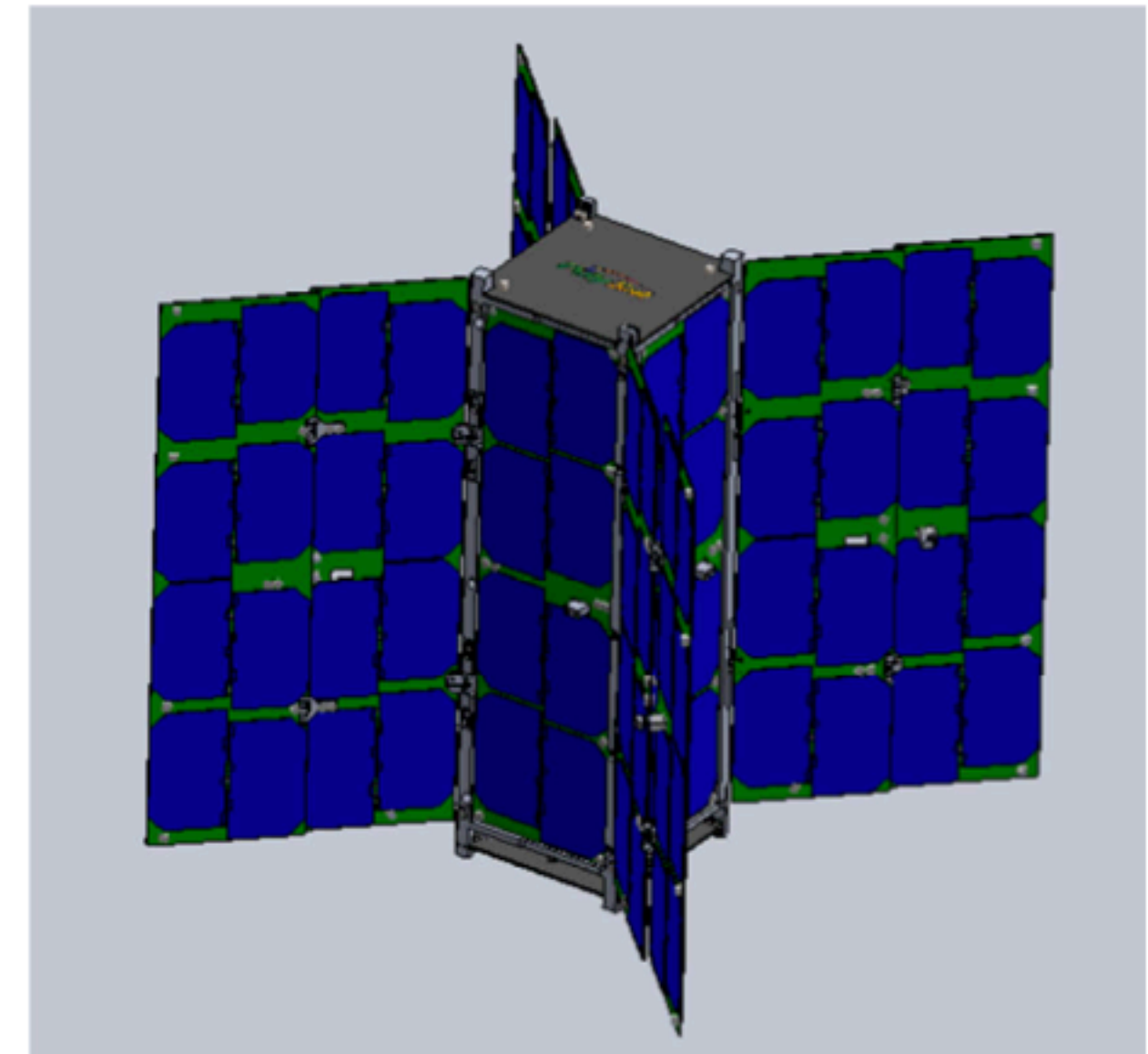
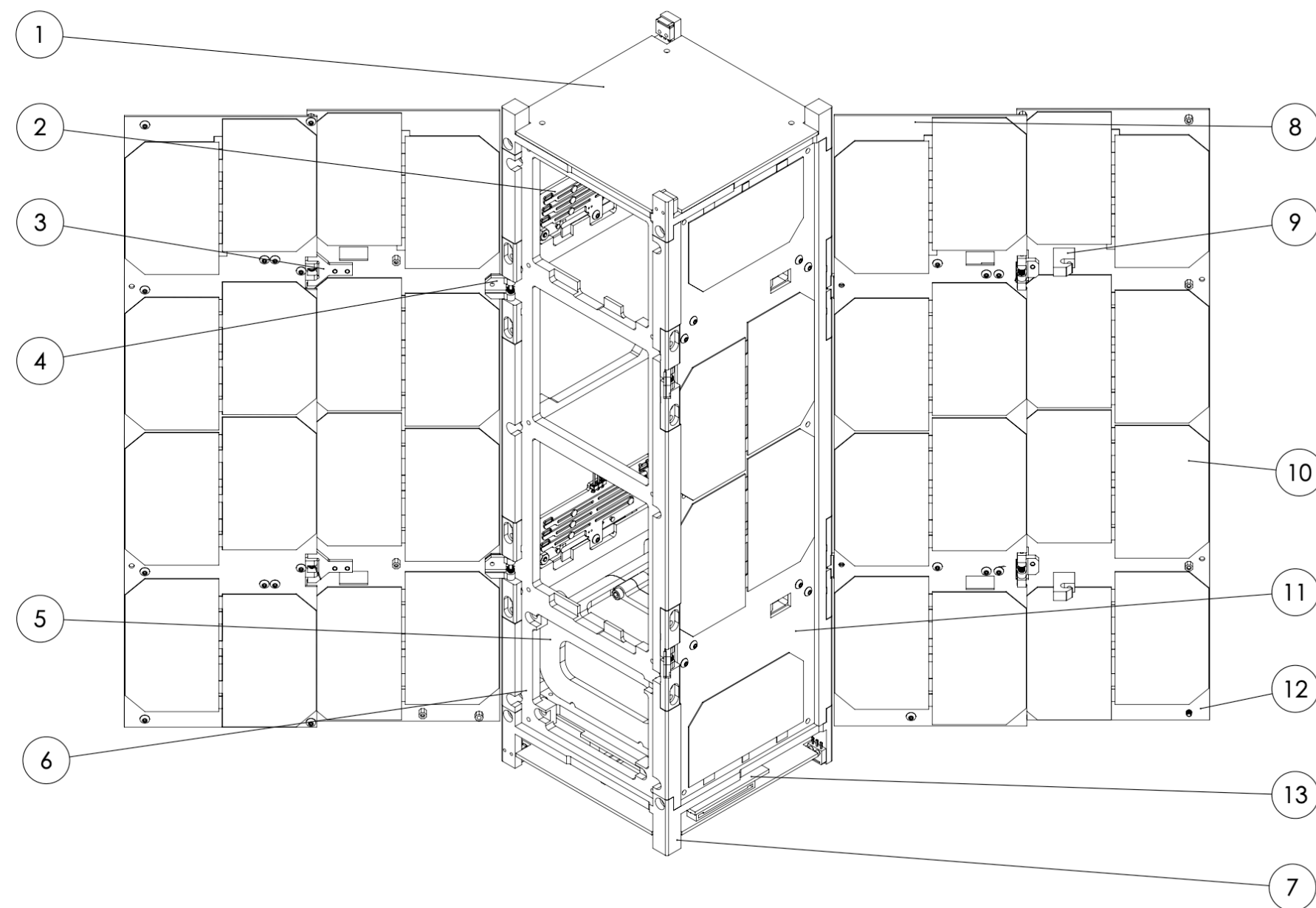
Tasks

- Explore the SVN Golf-TEE
 - Find Solar and Mechanical Related Files
- Try to get an import into Fusion 360
- See what Solar Cell Research Was Done

TESSERACT - Popout Panel Design

Edgar Uribe & Vanessa Faune

Based on PolySat



Take inspiration from an existing design

Extremely Detailed Analysis and documents in SVN- Golf-Tee/Mechinical/From Luigi

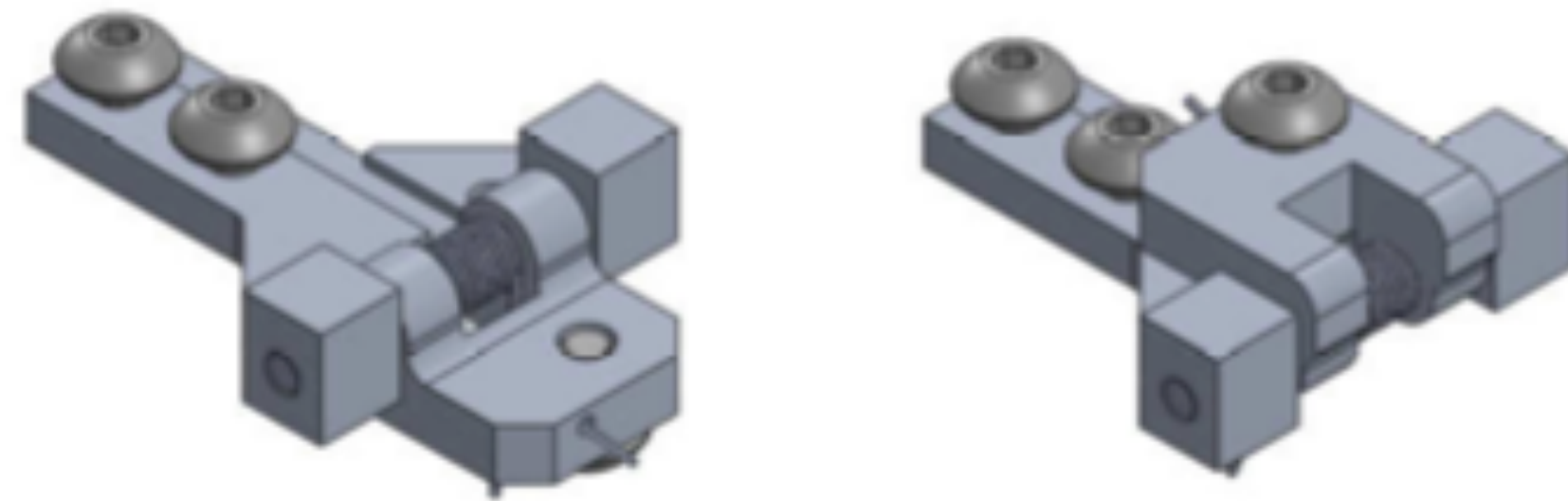


Figure 4.14 Second Hinge Assembly. Right is in stowed configuration and left is in deployed configuration.

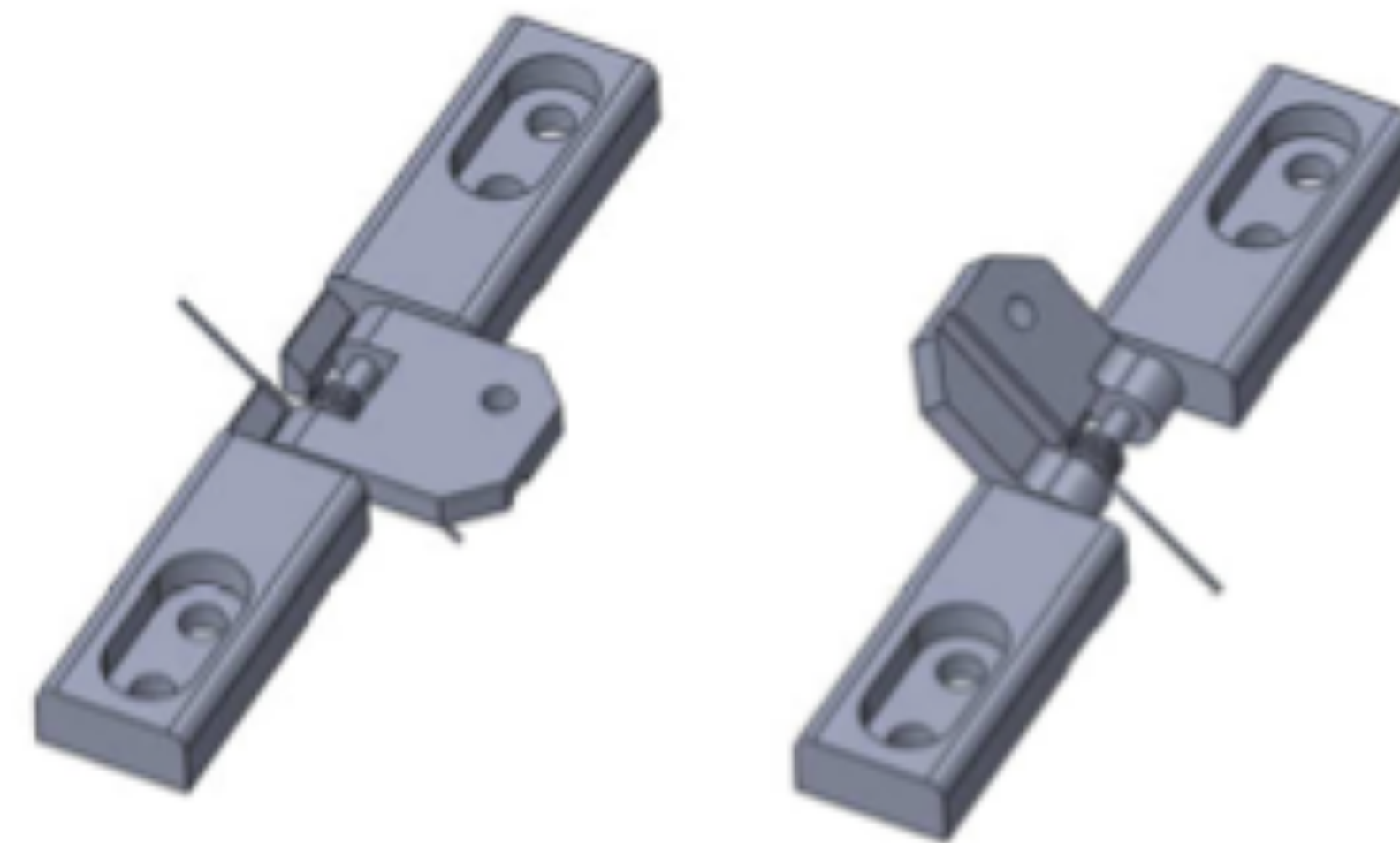
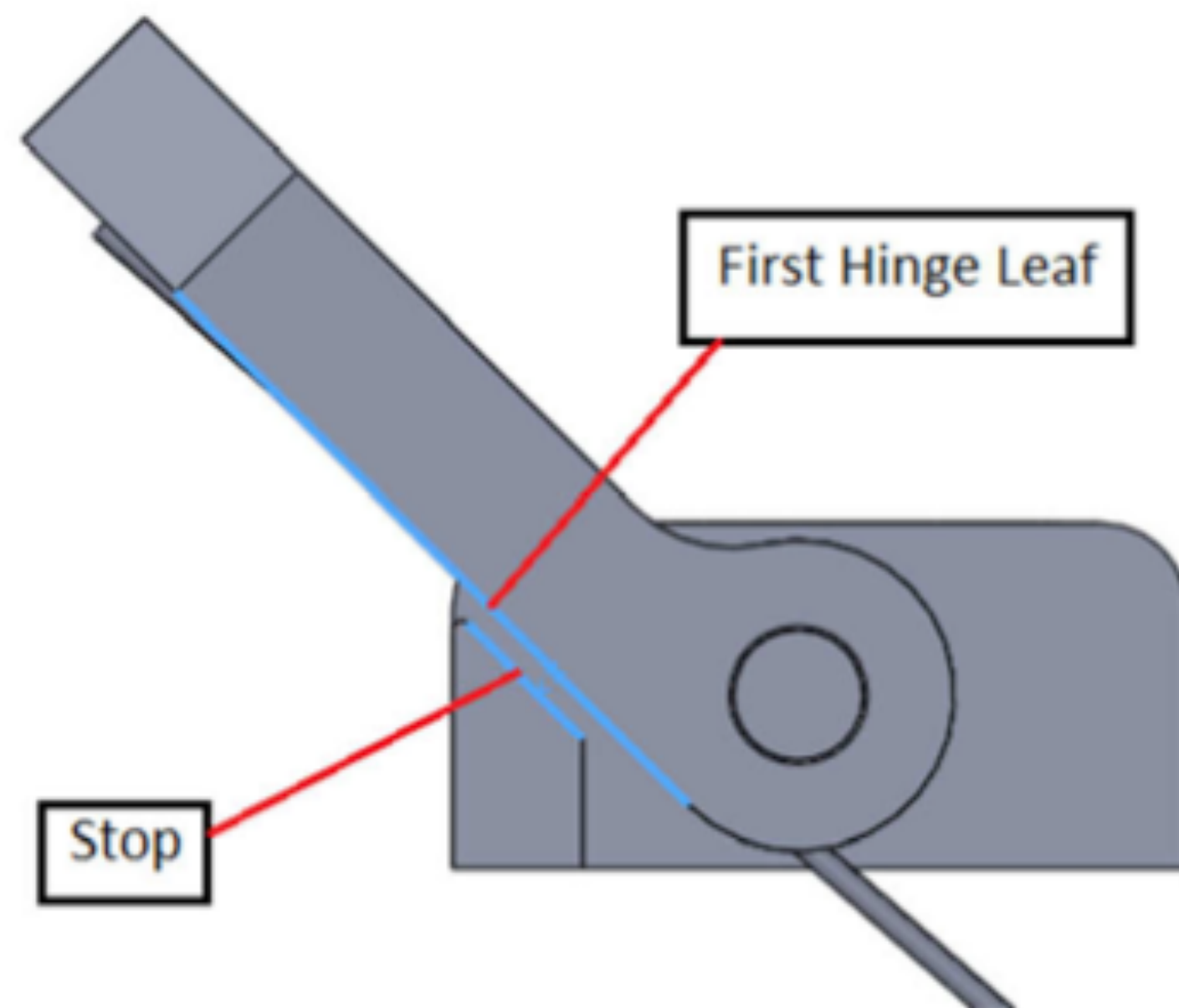


Figure 4.11 First Hinge Assembly. Left is in stowed configuration and right is in deployed configuration

CAD SVN- Golf-Tee/Mechinical/CAD BACKUP/ CAD_BACKUP....zip

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_-Z.iam		Jun 26, 2020 at 11:44 AM	6.1 MB	Document					
_SP_Z.ipt		Jun 26, 2020 at 11:55 AM	82 KB	Document					
3U box.ipt		Sep 22, 2017 at 9:45 PM	130 KB	Document					
3U_ENVELOPE_GOLF_INTERPRETATION.ipt		Jul 15, 2019 at 10:08 AM	215 KB	Document					
3U_ENVELOPE_STRICT_INTERPRETATION.ipt		Jul 15, 2019 at 10:08 AM	226 KB	Document					
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ADOBE Inventor Files - 300 a month subscription - no Mac support

Some missing support files I had to search the SVN for

AMSAT-Golf_Tee_Assembly-2.iam

IS FOUND IN GOLF-TEE SVN

Mechanical/CAD Backup/

Ragnarok_20181212_rarely_changes.zip

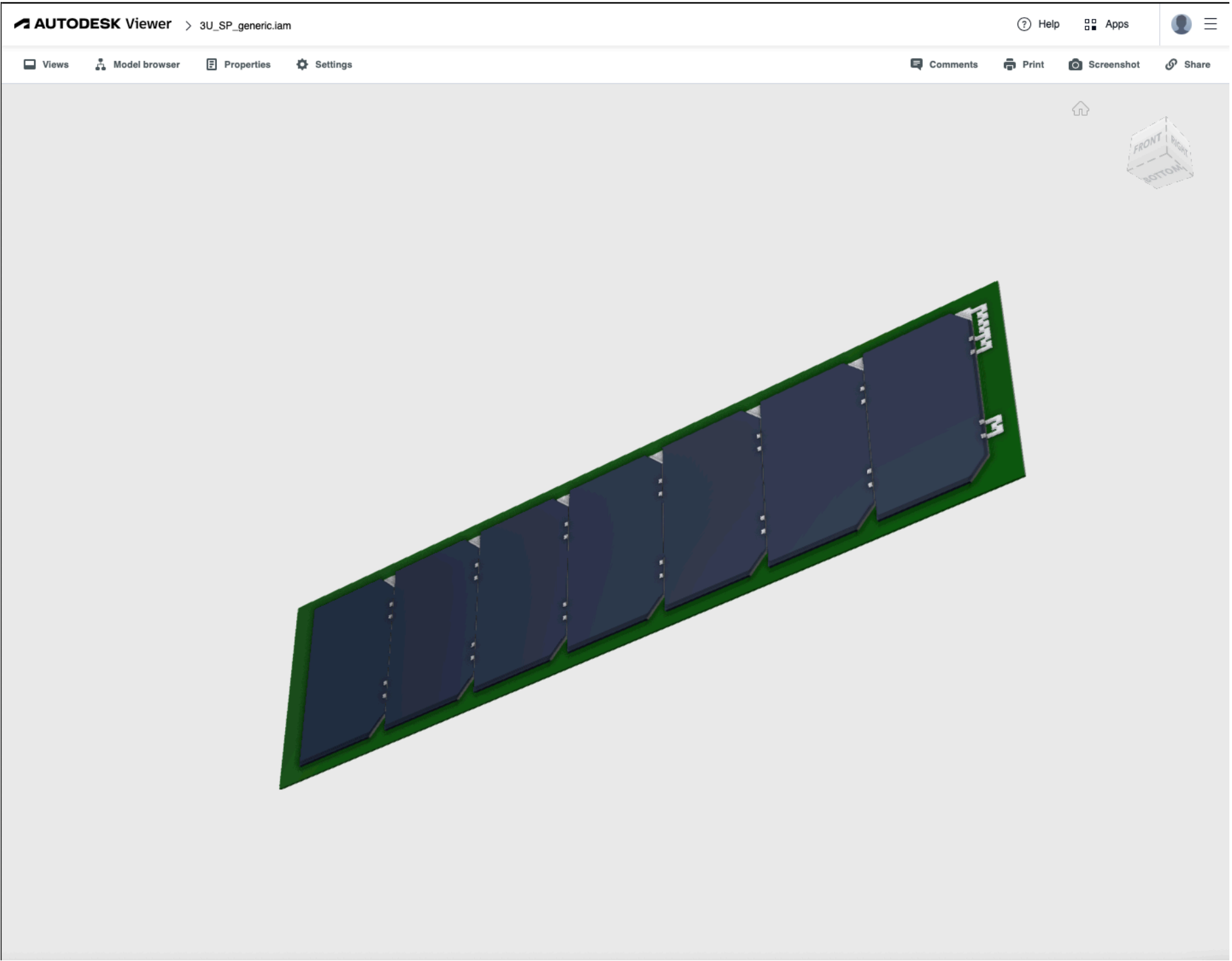
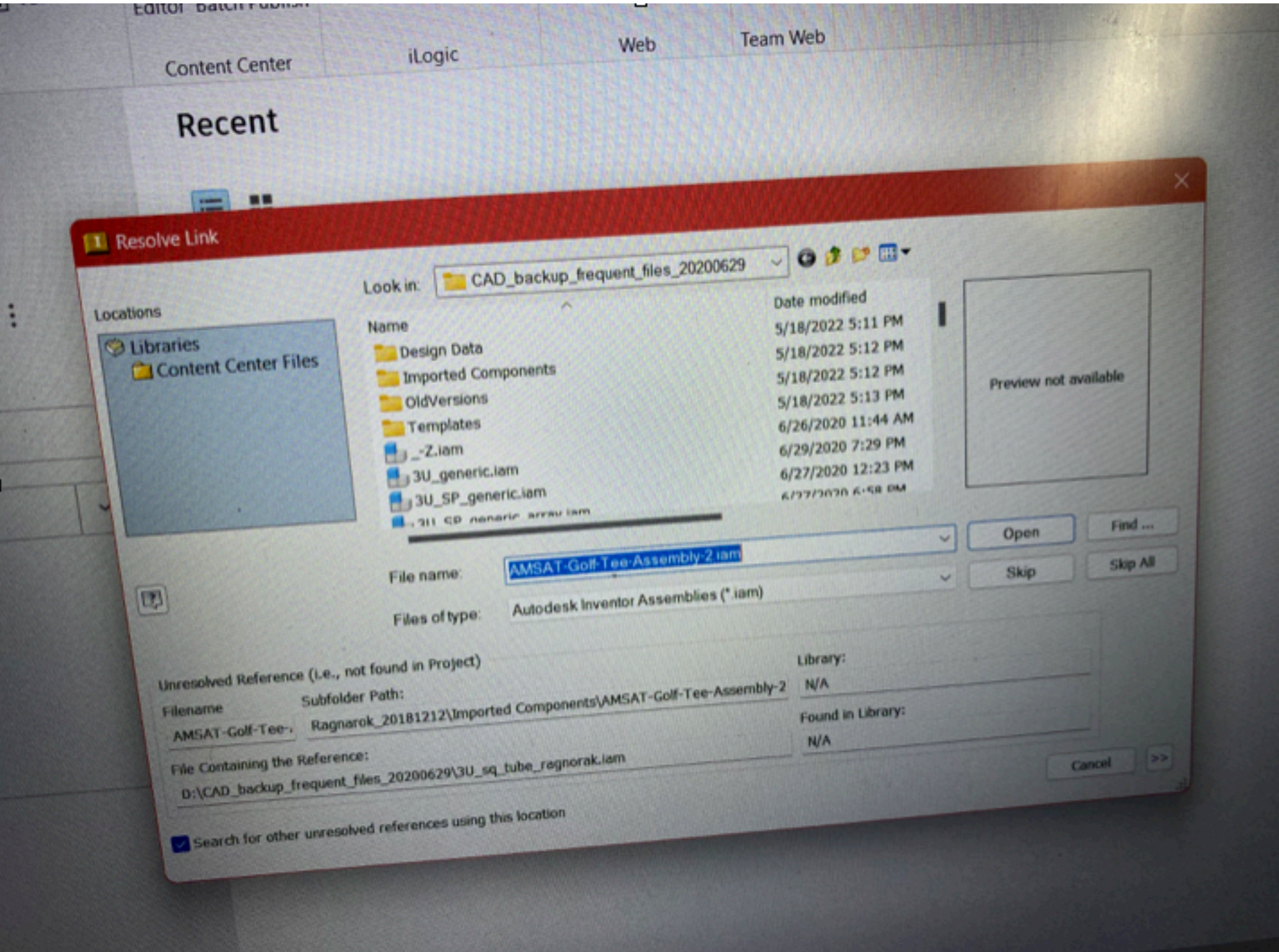
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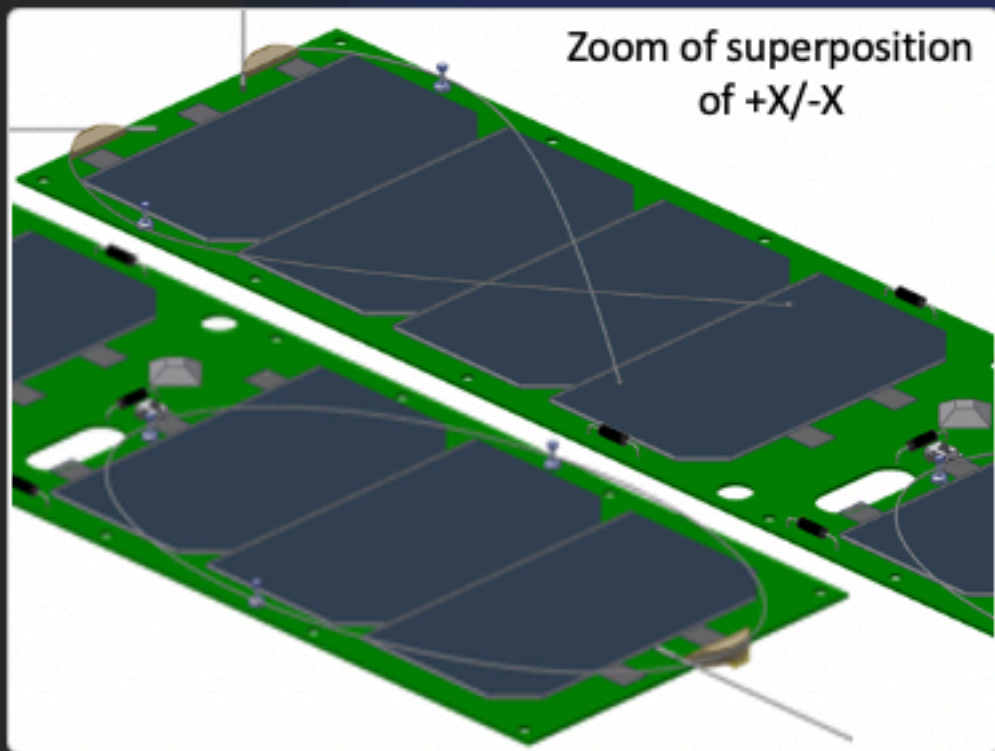
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GOLF-T +X/-X Solar

KF4KSS July 3, 2019

GOLF-T +X/-X Solar

KF4KSS July 3, 2019



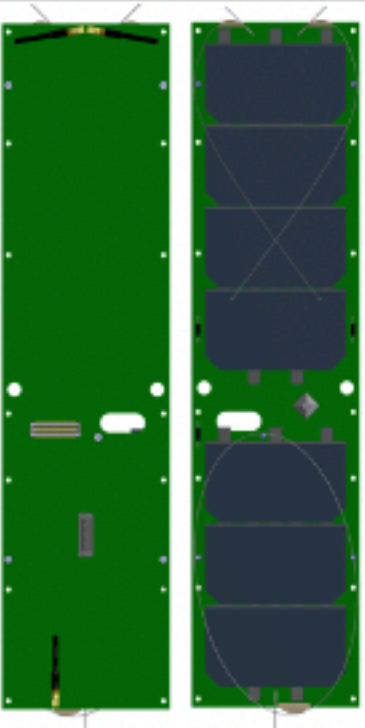
GOLF-TEE +X/-X Fixed Solar Panels

- Still on track for one layout populated as +X or -X
- False-part "superposition" shown on right, where everything is populated
- 0.031" PCB, ENIG at least on entire backside
- Total thickness ≤ 6.0 mm of 6.5 mm envelope
- TBD-layer, but 2-layer if possible
- 7 CIGs same 39.5mm length as Fox's Spectrolab UTJ
 - Cropped corners will remain available if SolAero's triangular bypass diodes
- Samtec MEC1-120-02-F-D-NP 20-row 40-pin SMD for fingers on CIU
 - A for alignment pins too long for 0.031" PCB
- Slot access for (RBF & miniUSB) and (battery charge)
 - Sides selected as convenient for CIU routing
- Cluster of 4 CSS photodiodes assumed on TBD pyramid
- Holes for solar panel covers
 - On Fox, we used #2-56 Jack Posts to install the panels, but those can't be placed in the path of the deploying whip antennas.
 - Requires that structure have threads to accept #2-45 screws
 - Locations TBD and notionally placed
 - Desire that covers be symmetric
 - Possibly contacting Rails and using L & R edges of solar panel as alignment to prevent "finding the hole" by accidentally scrapping CIGs



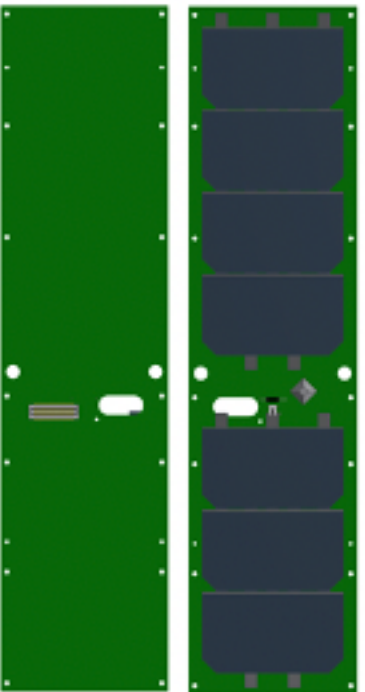
GOLF-TEE +X (sun) also has

- QSH-030-01-L-D 30-row 60-pin SMD for bus QTH on LEPP
 - A for alignment pins too long for 0.031" PCB
- Two Samtec MMCK-J-P-H-RA-SM1 MMCK RA SMD for UHF TXs
 - 0.58 mm taller is preferred (no coax slips between AMSAT's and Ragunark's square tubing)
 - Both coax likely trapped in structure at assembly, so other end must be connectorized too.
 - No plans for matching circuit, and trace on backside is short
- Samtec MMCK-J-P-H-RA-SM1 MMCK RA SMD for VHF RX
 - Coax not trapped at assembly but for convenience should be connectorized to RF MatriX
 - no plans matching circuit and trace on backside is short
- Same as Fox, RG-178 coax with straight MMCK
- Two UHF TX and one VHF RX wires are straightened Nitinol, same as Fox
 - Lou's wire wrap at root and tip, and suggests teflon tubing
 - Min bend radius at root around epoxied G10 circular segment
 - UHF's long unsupported end is different from Fox and vibration risk so may adjust stowed shape and distance to stow sensor
 - VHF is about 1.5 loops stowed
- Fishing line knotted at antenna tip and antenna post
 - From Fox, Berkeley Fireline Fused Crystal with Dynesema-4lb (0.13 mm)
 - No simultaneous redundant resistors so no fishing line debris in orbit
- RWR81 leaded resistor to melt fishing line
 - Wish to improve lateral stiffness of leads, so epoxied G10 blocks
- Stow sensor: Keystone Electronics 1520-1 PCB-swage solder terminal single turret, shown but looking. Lou: 1kΩ.



GOLF-TEE -X (anti-sun) also has

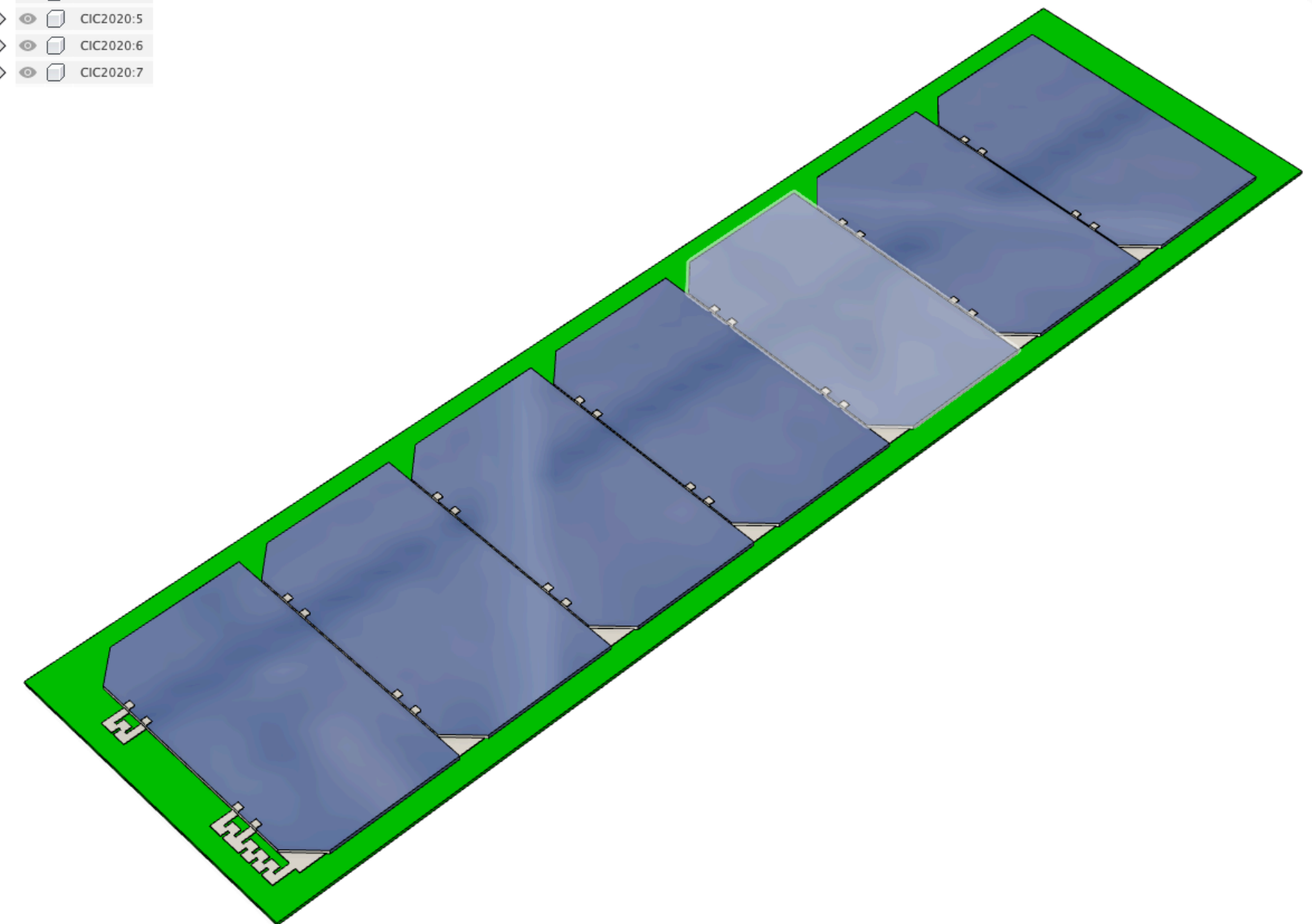
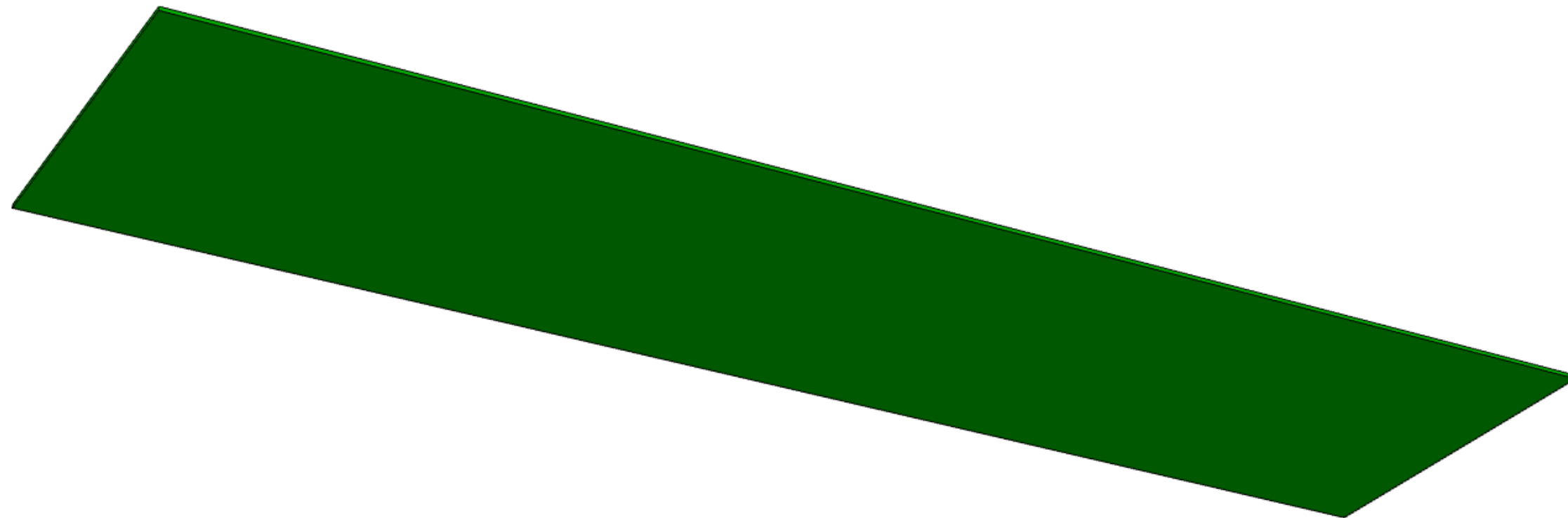
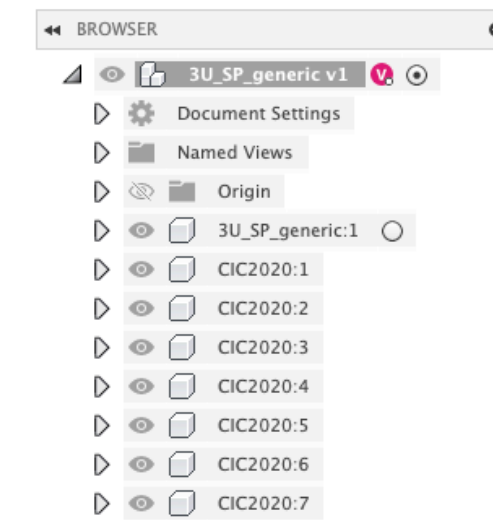
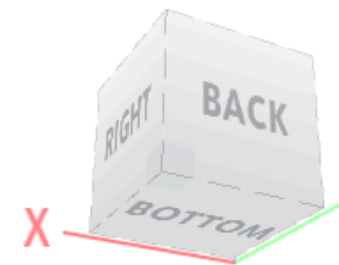
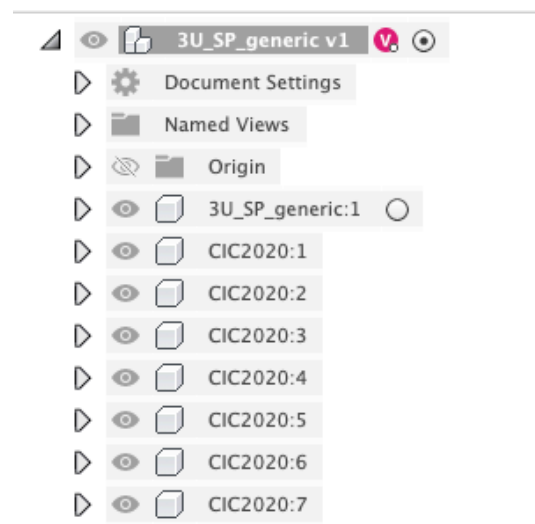
- Restraint of Kent's Ultra Wide Band antenna, but hinges are located elsewhere on -Z panel
 - May request slightly longer UWB PCB for favorable angle of fishing line
- Fishing line knotted at antenna edge, around resistor, then back knotted at antenna edge
 - From Fox, Berkeley Fireline Fused Crystal with Dynesema-4lb (0.13 mm)
 - No simultaneous redundant resistors so no fishing line debris in orbit
- RWR81 leaded resistor to melt fishing line
 - Wish to improve lateral stiffness of leads, so epoxied G10 blocks
- Stow sensor for UWB is C&K HDT0004 (Fox sep switches)
 - Fishing line path needs attention for proper angle, so likely UWB-PCB needs to be longer



[No Title]

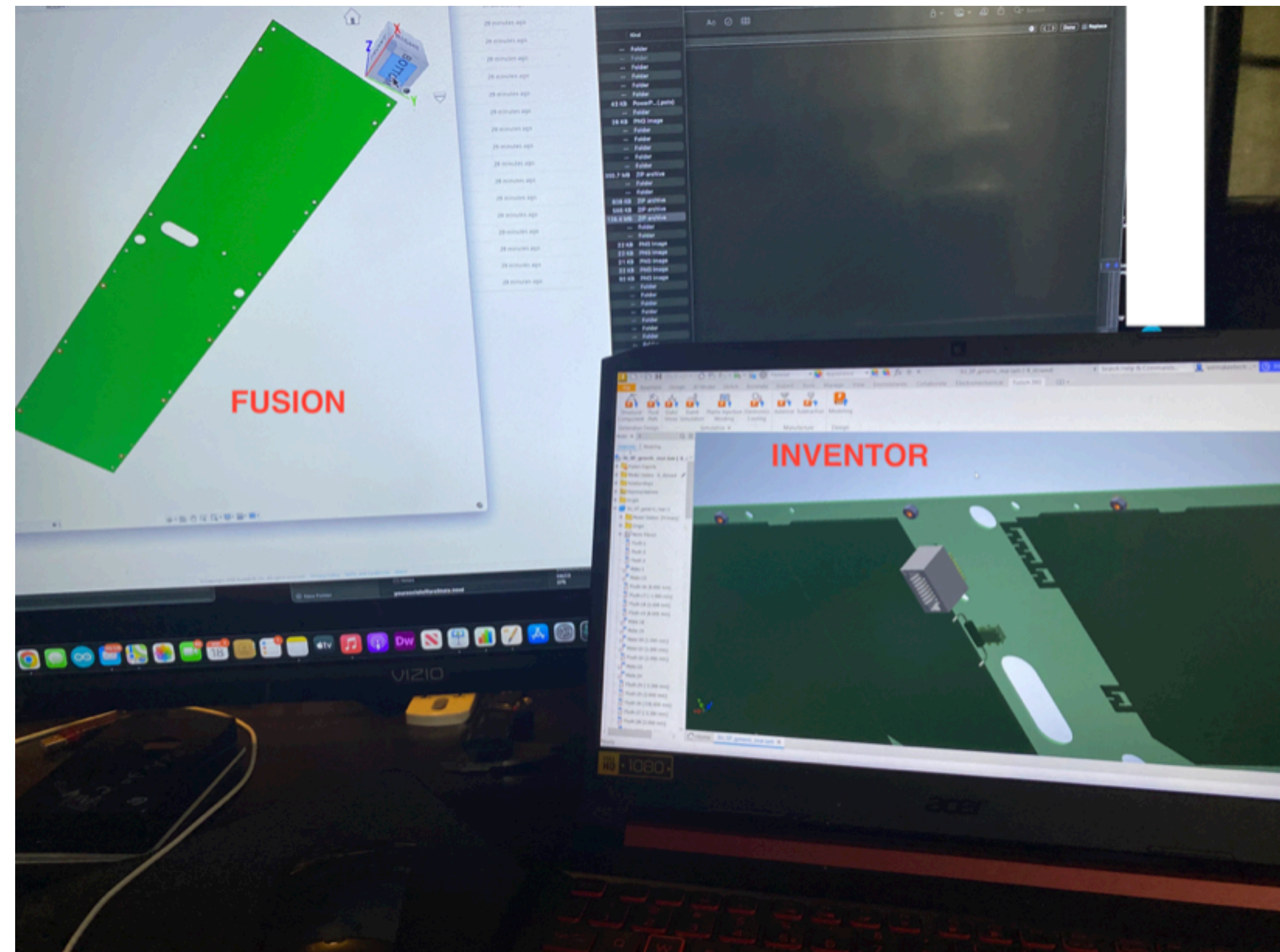
3U_SP_generic.iam

In Fusion360



3U_SP_rear.iam

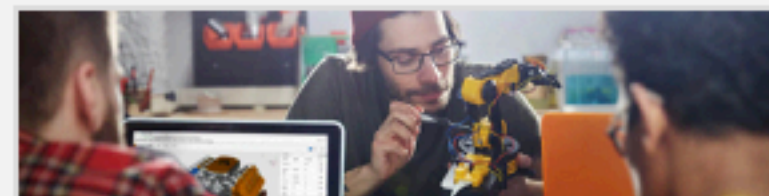
Fusion Import vs Inventor Native



Why FUSION 360?

Relatively Inexpensive Monthly
Compatible with Many Technology Stacks
Includes CAM Computer Aided Machining
Free and Reasonable Monthly Cost Options
In great common use for DIY/MAKER and Industrial Use

FREE OPTIONS



Fusion 360 for personal, hobby use

Free for individuals who are doing hobby, non-commercial design, and manufacturing projects.

Free - qualification required

LEARN MORE



Fusion 360 for startup use

Free for eligible venture-backed, angel-backed, or bootstrap startups that are less than 3 years old and have 10 or fewer employees.

Free - application required

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Fusion 360 for educational use

Free for qualifying students and educators who need Fusion 360 for individual use or institutions using in a classroom setting.

Free - validation required

LEARN MORE



Questions

- What is RAGNAROK?
- SVN: Golf-tee/solar Panels Directory (Valid?) Do we have these parts?
- KF4KSS July 3, 2019 Solar Document is this still relevant - SVN
Solarpanbels/concept/Golf-T XX_X Solar Mechanical 20190703.pptx
- Do we have the cells?
- Do we have inventor license?
- Is it really necessary for the Solar Team to have imported copy of other mechanicals or is it possible conform to specifications?
- Any recommended resources I should consider (PDF? Software?)
- Is it smarter to fly something like the TESSERAK design where there are panels on more faces in case of emergency? Or is Guidance to be relied upon to point at sun?
- Do we really save files in .ZIP inside of the SVN? This makes these files hard to search into
- Should I make a Solar Panel 2022 in the SVN?
- Rely on the structure of the PCB, or should the panel have a super fine frame that the PCB sits into that Mechanism and space frame attaches to (I.E. hinges directly on PCB or on a frame?)

Next Steps

- Continue Resource Identification
- Continue Import Effort
- Does the team need anything from me?

Further

- Machine / 3D Print Stand In Example Parts
- Begin New Design File
- Order “prototype” solar panel board