



Satellite 인공위성

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SPACE SCIENCE

01 Topic Selection(주제 선정)

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01



Topic Selection

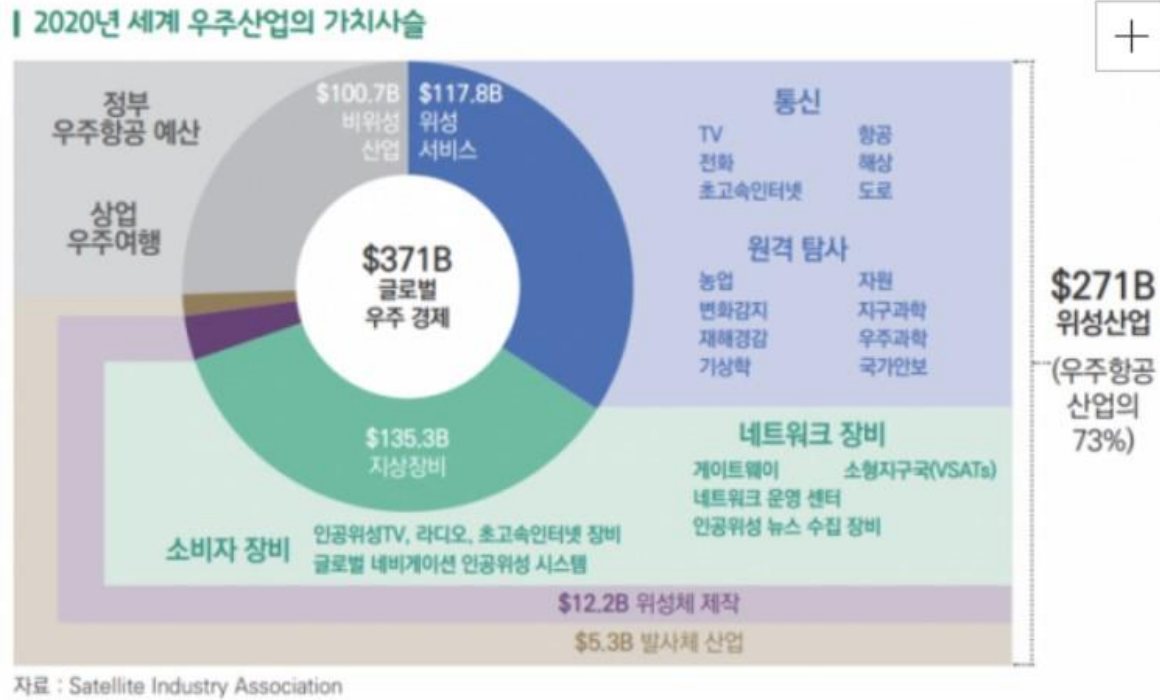
주제선정

1. 테슬라의 스타링크
2. 우주산업 가치 상승
3. 대한민국 우주산업 규모 확대의 필요성



1-2. 우주산업 가치상승

🌀 2020년 세계 우주산업의 가치사슬



▲2020년 세계 우주산업의 가치사슬 (사진제공=무역협회)

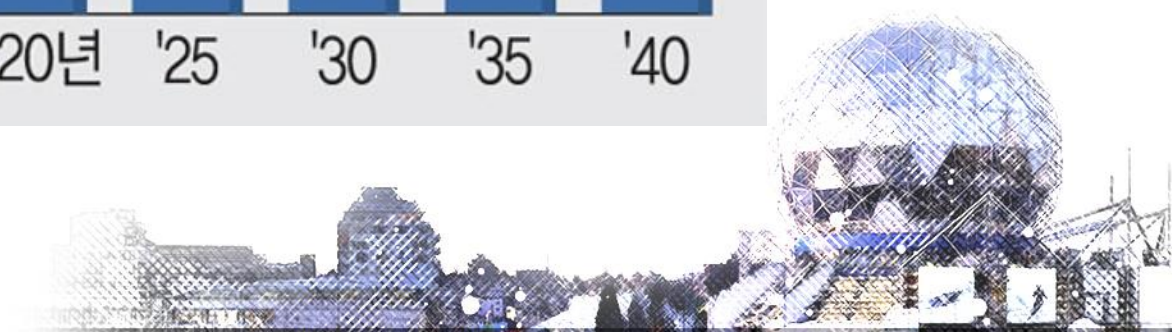
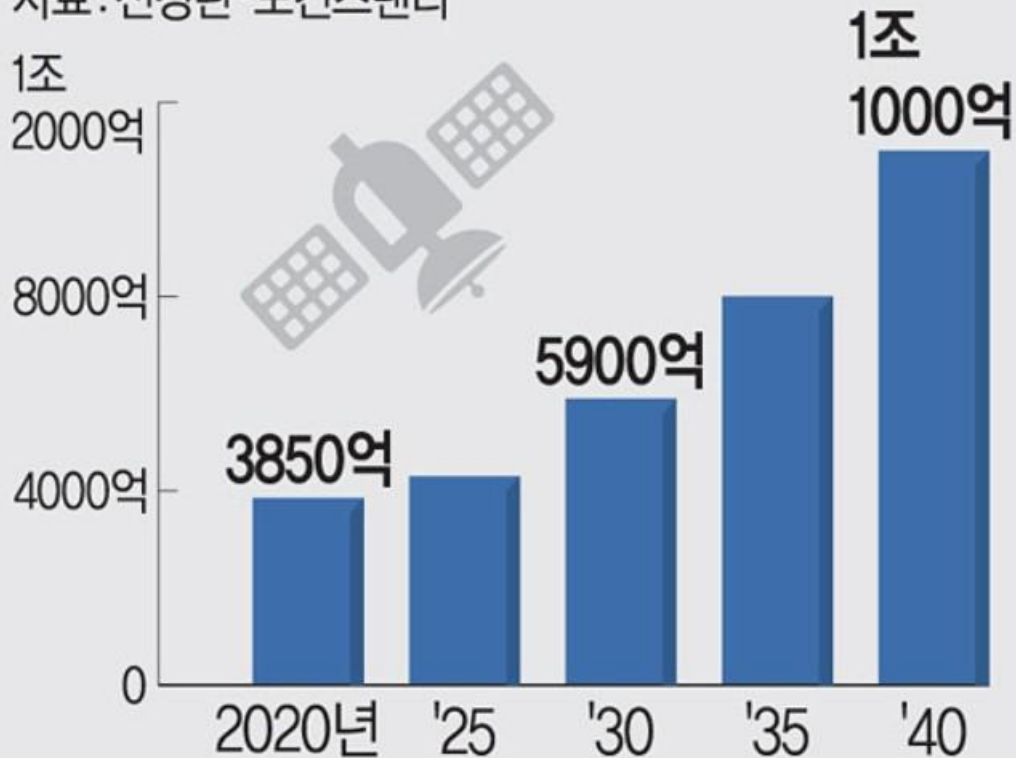


1-3. 대한민국 우주산업 확대의 필요성

SPACE SCIENCE

세계 우주산업 시장 전망 (단위:달러)

자료:전경련·모건스탠리



02. Modeling process

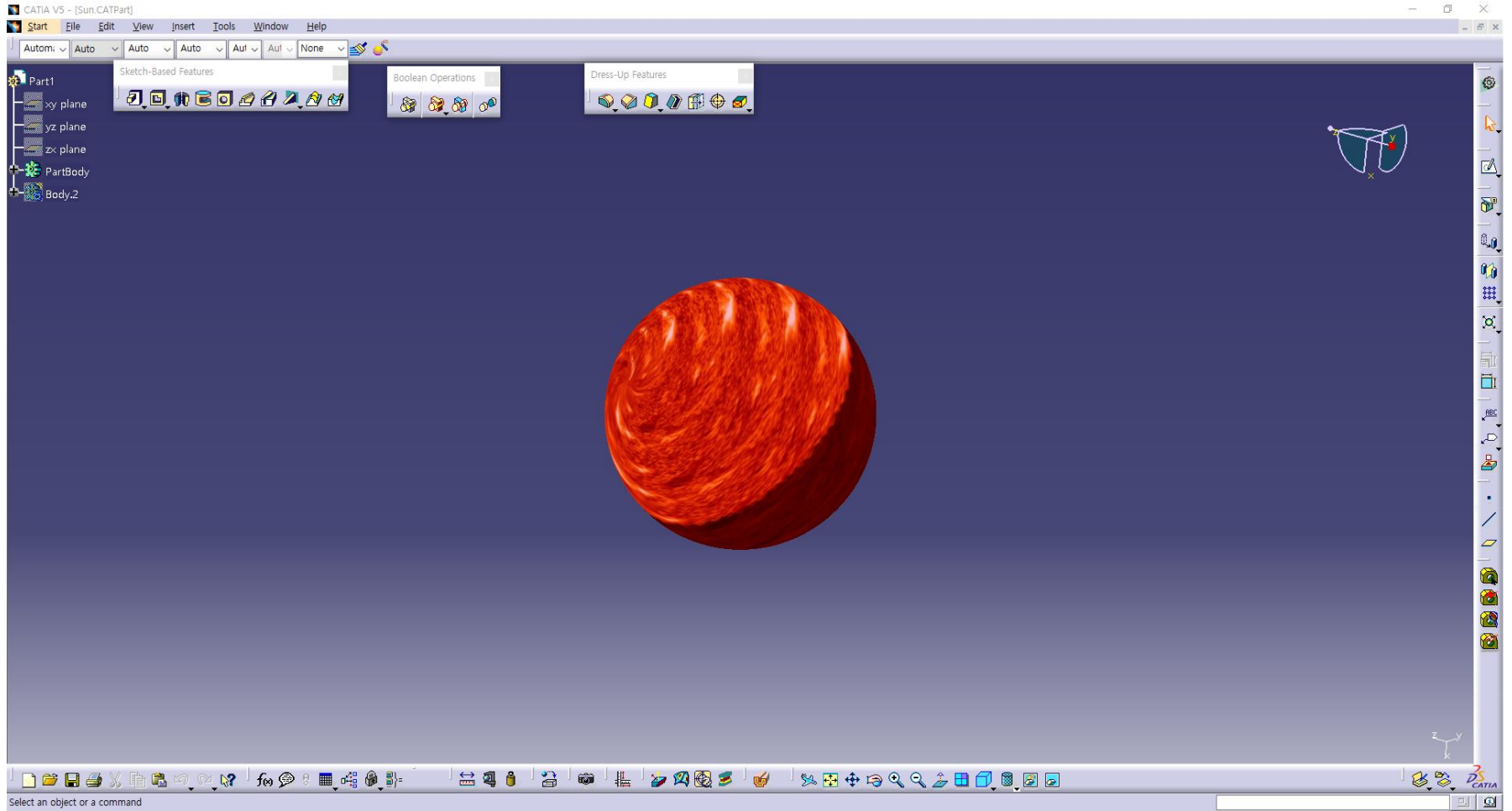
모델링 과정

1. Part design

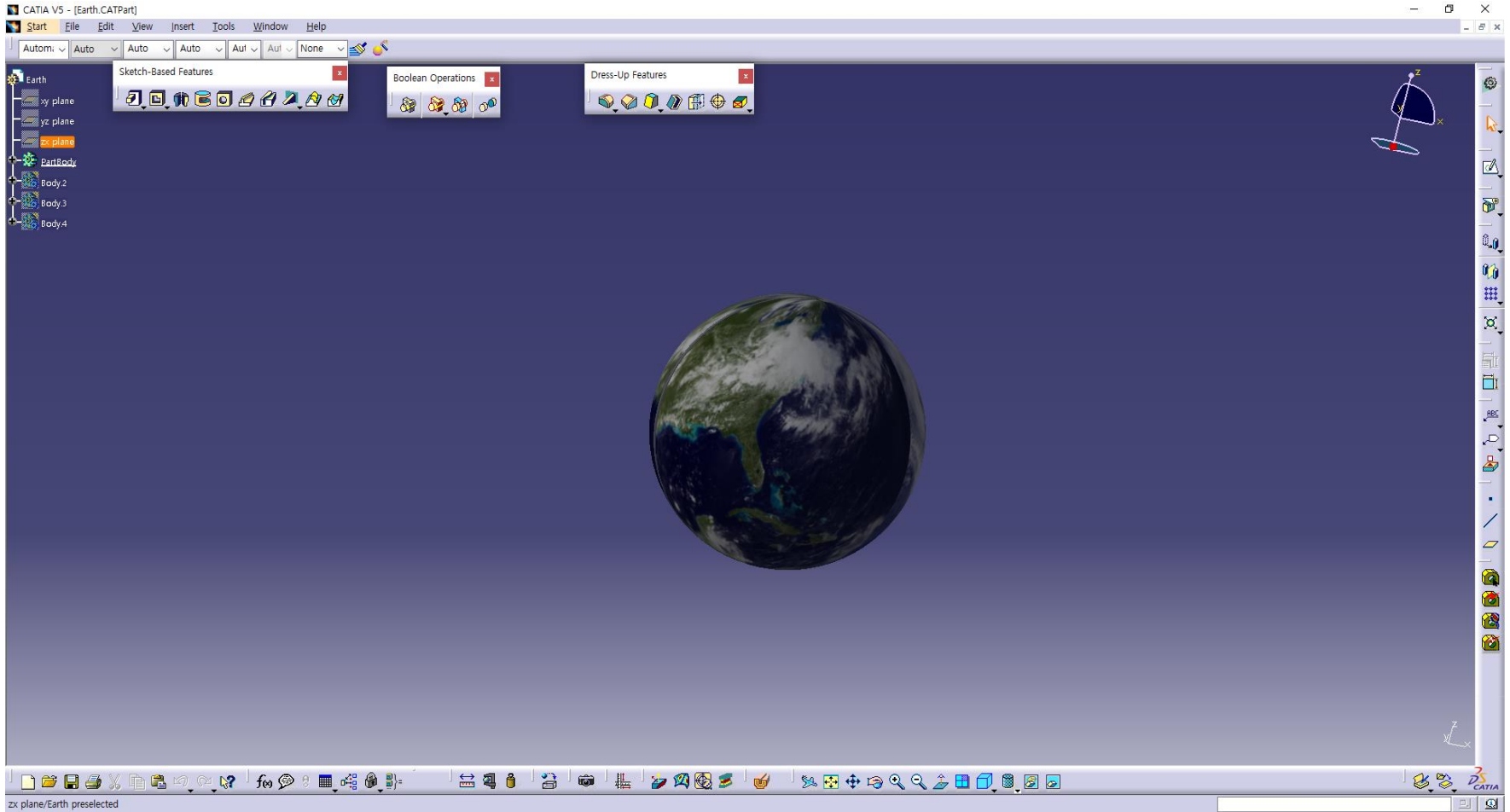
2. Assembly



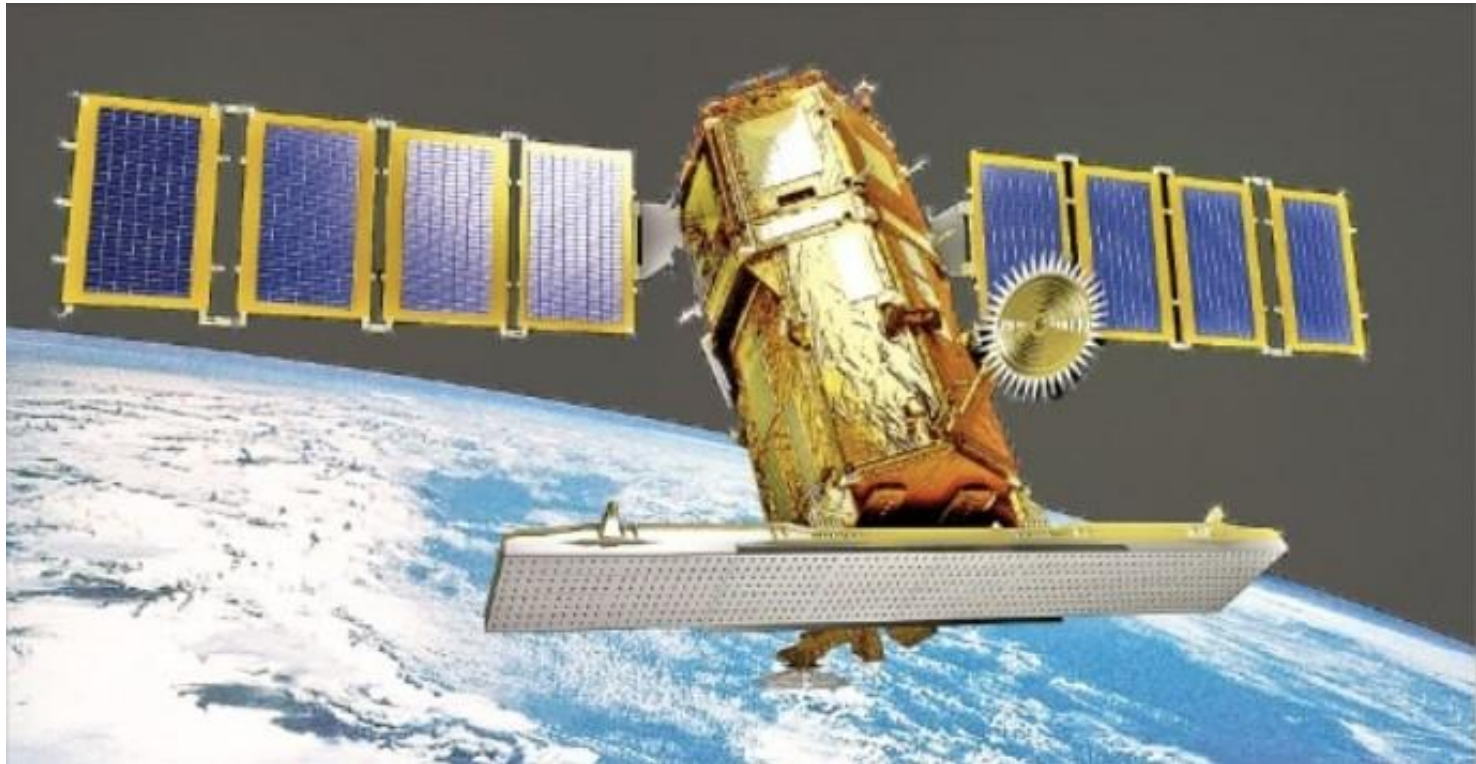
1. Part-Design Sun



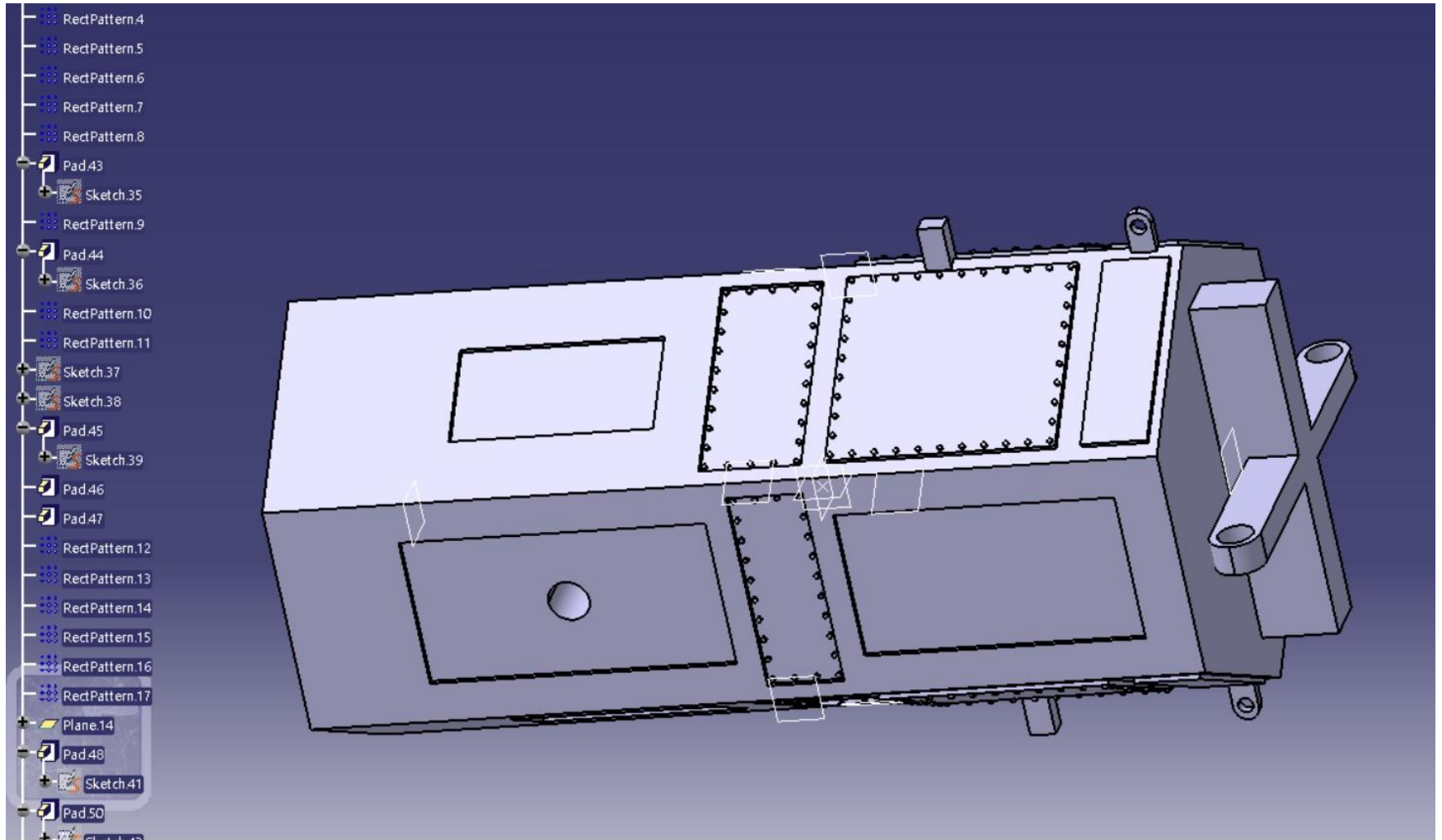
1. Part-Design (Earth)



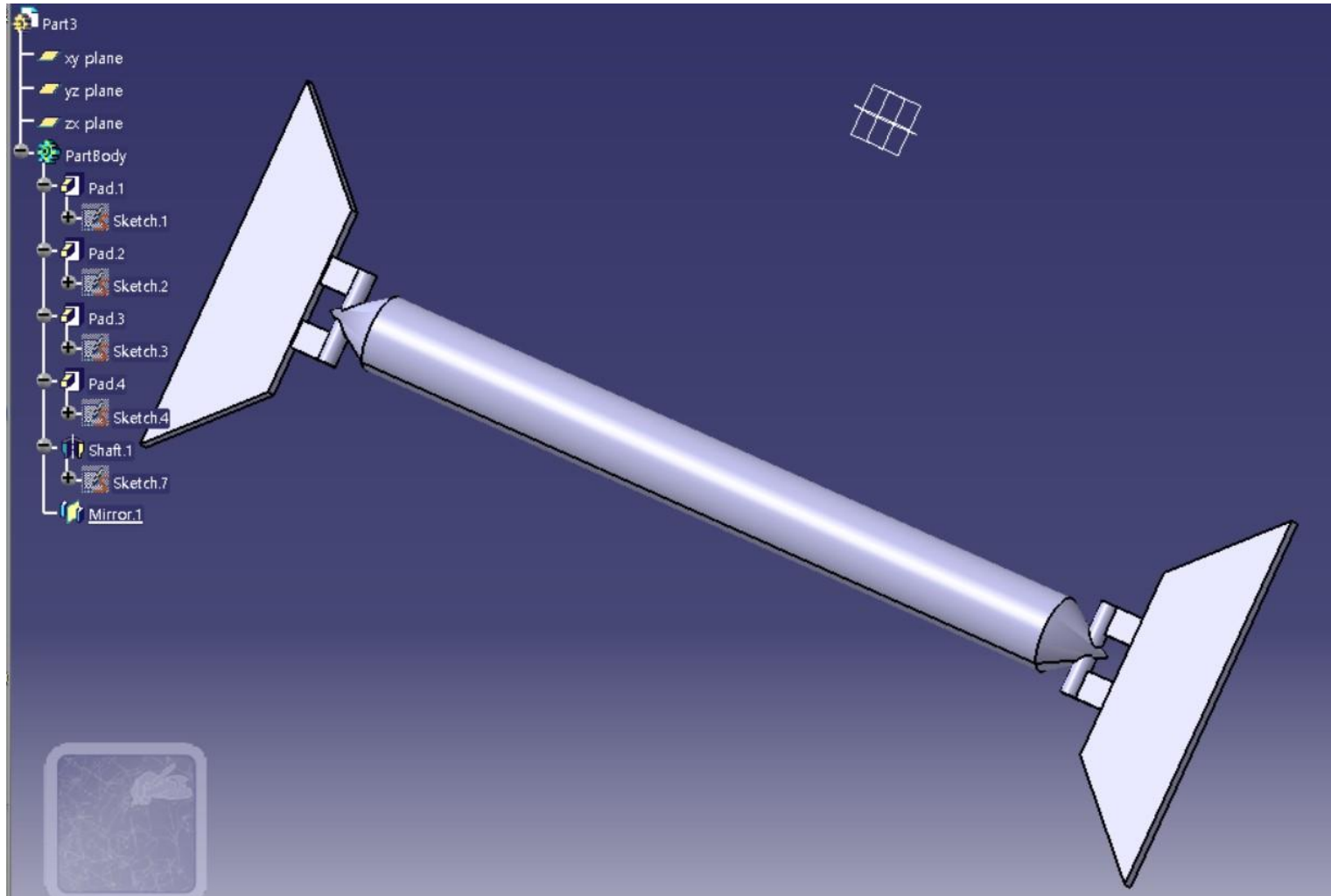
1. Part-Design 참고 사진



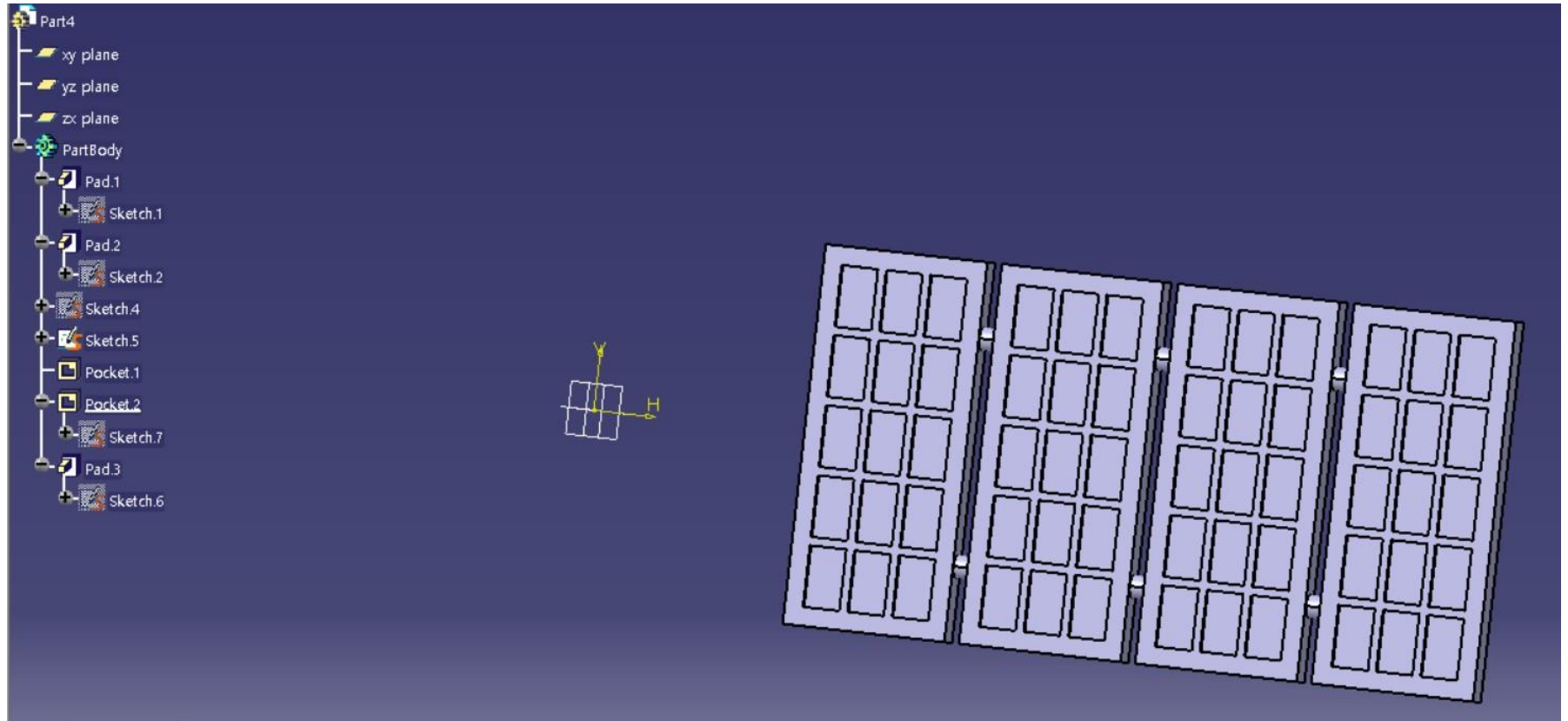
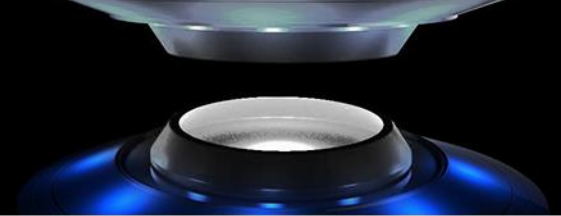
1. Part-Design (Satellite Body)



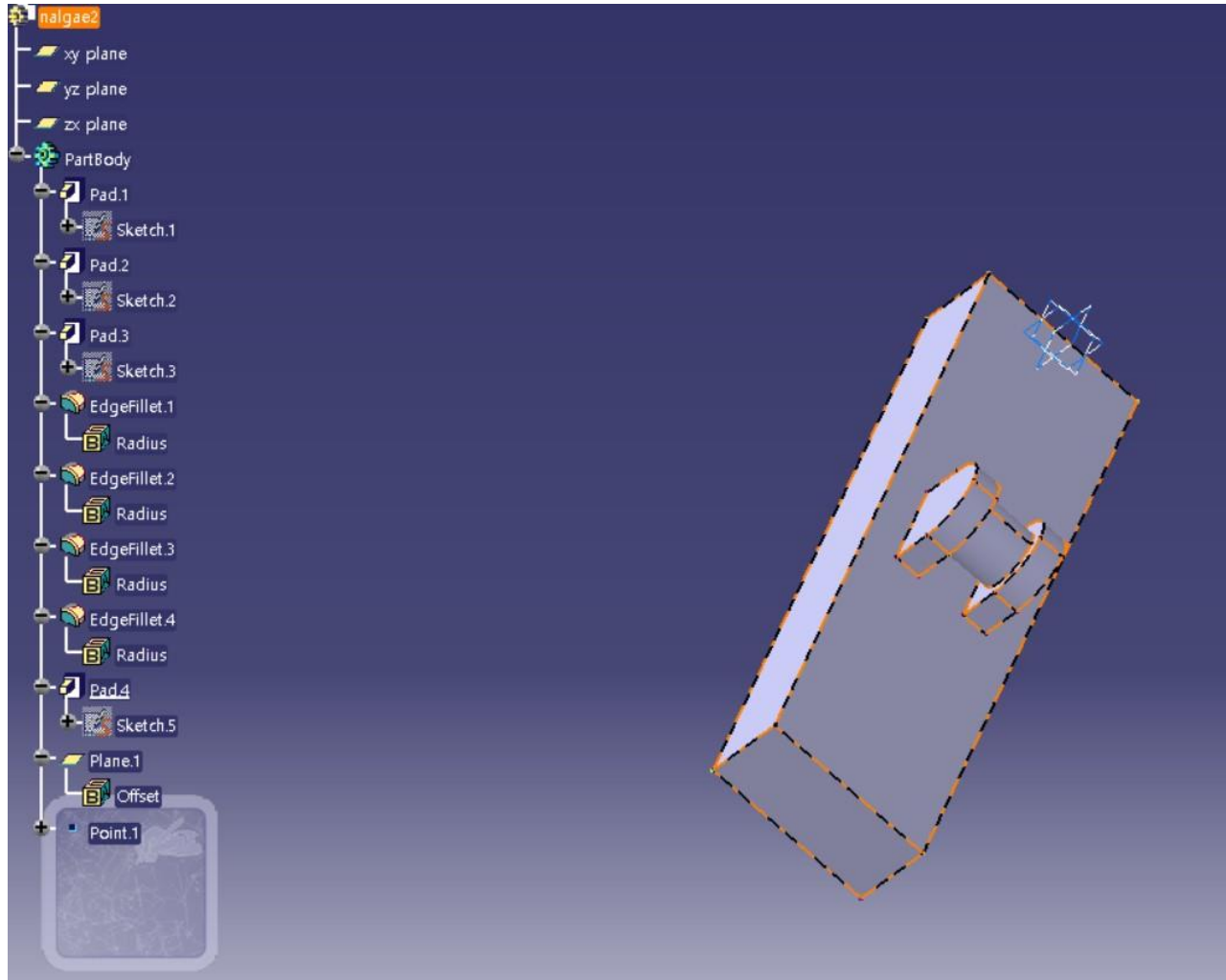
1. Part-Design (Connection rod)



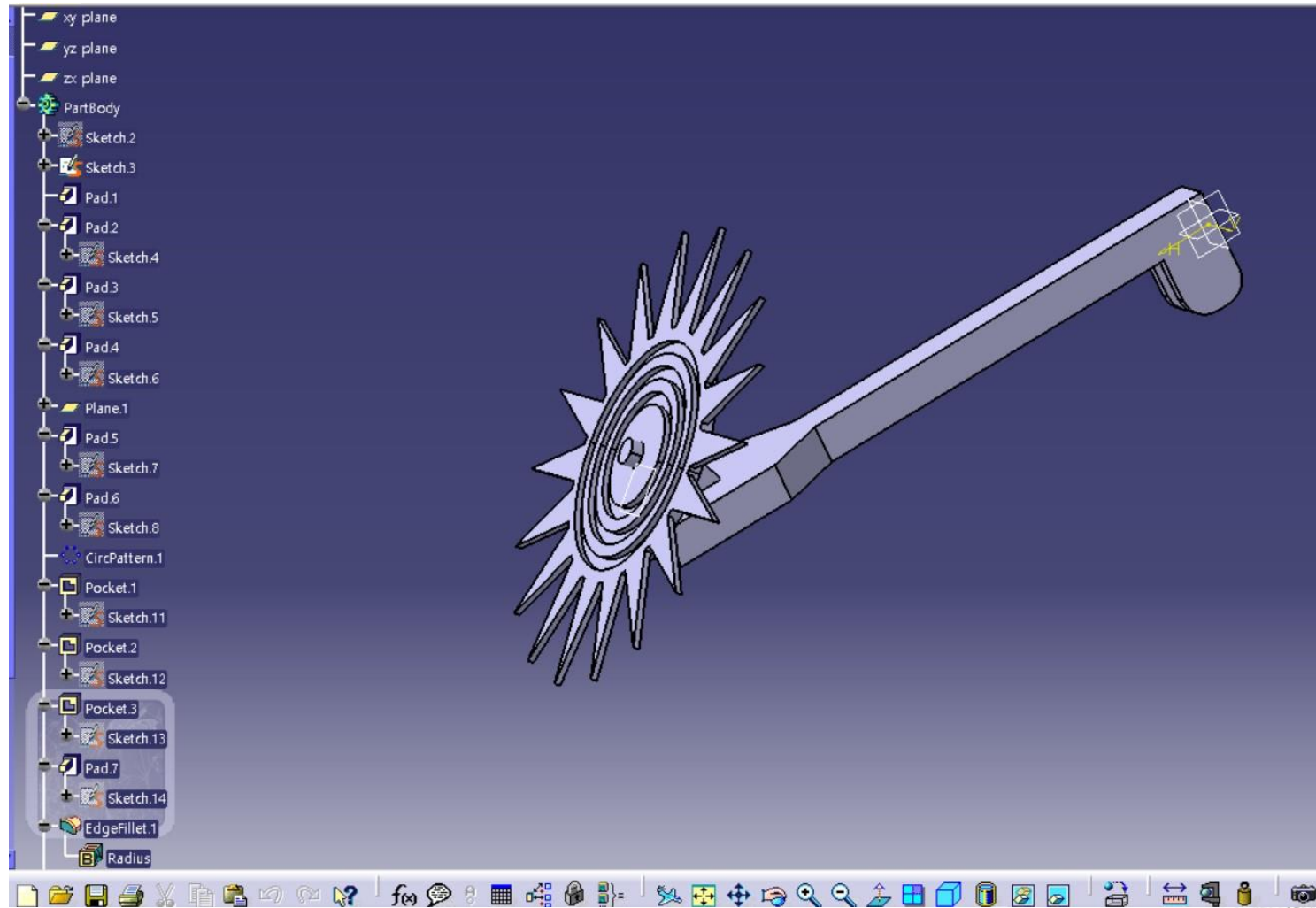
1. Part-Design (Solar Panel)



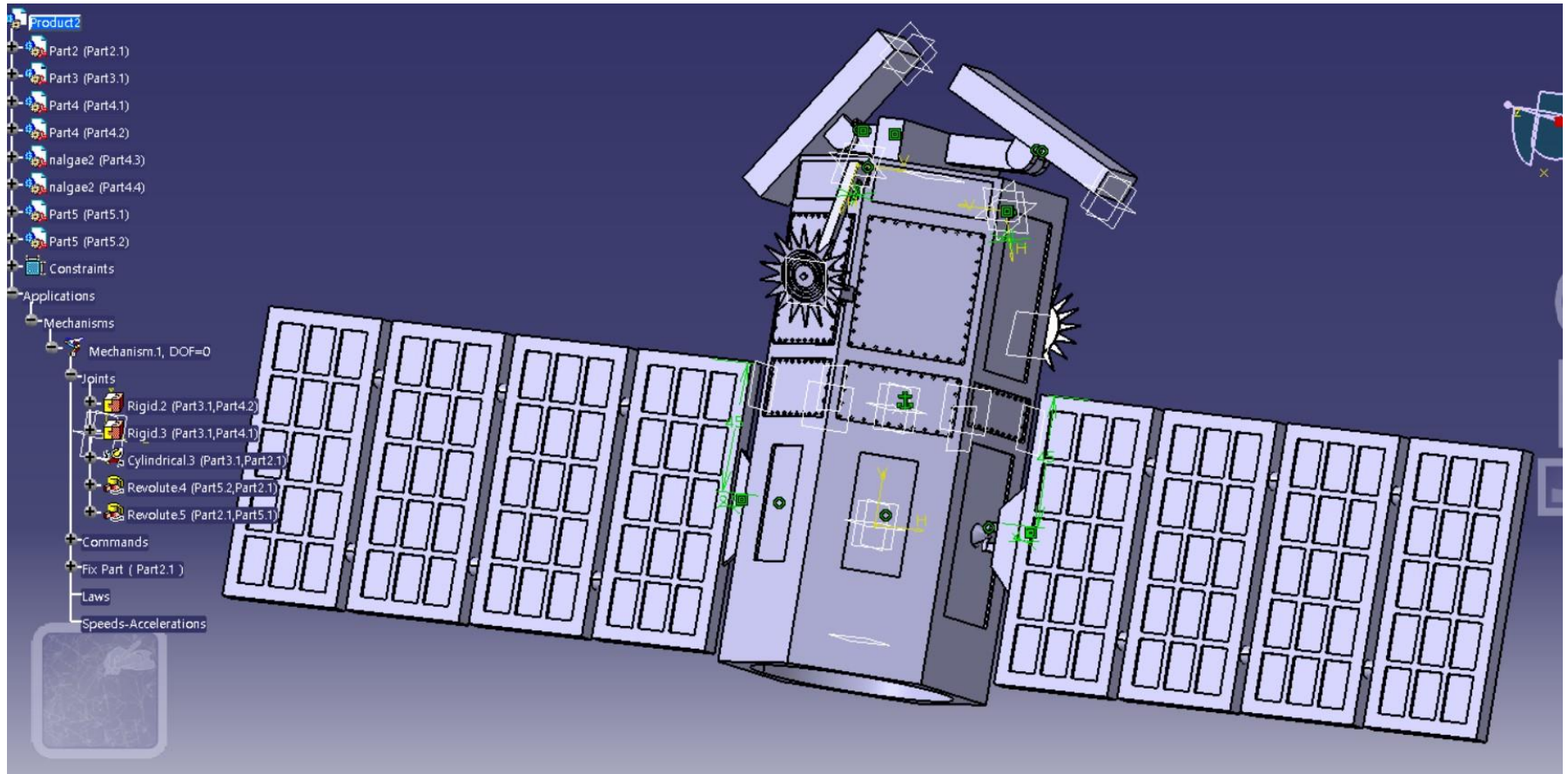
1. Part-Design (connection rod2)



1. Part-Design (Connection rod3)



2. Assembly (Satellite)



03. DMU Kinematic Implementation

움직임 구현



3. DMU Kinematic implementation

The screenshot displays the CATIA V5 software interface for a satellite model. The left-hand tree view shows the following structure:

- Part4 (Part4.1)
- Part4 (Part4.2)
- nalgae2 (Part4.3)
- nalgae2 (Part4.4)
- Part5 (Part5.1)
- Part5 (Part5.2)
- Earth (Earth.1)
- Part1 (Part1.1)
- Constraints
- Applications
 - Mechanisms
 - Mechanism.1, DOF=0
 - Joints
 - Rigid.2 (Part3.1,Part4.2)
 - Rigid.3 (Part3.1,Part4.1)
 - Cylindrical.3 (Part3.1,Part2.1)
 - Revolute.4 (Part5.2,Part2.1)
 - Revolute.5 (Part2.1,Part5.1)
 - Revolute.6 (Earth.1,Part1.1)
 - Revolute.7 (Part2.1,Earth.1)
 - Revolute.8 (Part2.1,Part4.4)
 - Revolute.9 (Part4.3,Part2.1)
 - Commands
 - Fix Part (Part1.1)
 - Laws
 - Speeds-Accelerations
 - Simulation
 - Sequences

The central 3D model shows a satellite with a gold body and blue solar panels. The right-hand side features a 'DMU Kinematics' toolbar and a 'Kinematics Simulation - Mechanism.1' dialog box. The dialog box contains the following data:

Command	Value	Min	Max	Current
Command.2	-1	1	0.0000	0.0000
Command.3	-60	180	-60.0000	-60.0000
Command.4	-30	60	60.0000	60.0000
Command.5	-180	180	-180.0000	-180.0000
Command.6	-360	360	0.0000	0.0000
Command.7	-360	360	0.0000	0.0000
Command.8	-52	38	-52.0000	-52.0000
Command.9	-25.3247	64	-25.3247	-25.3247

Additional options in the dialog box include:

- Activate sensors
- Plot vectors
- Simulation: Immediate On request
- Number of steps: 750

3. DMU Kinematic implementation

CATIA V5 - [satellite final.CATProduct]

Start File Edit View Insert Tools Analyze Window Help

Autom: Auto Auto Auto Aut Aut None

Product

- Part2 (Part2.1)
- Part3 (Part3.1)
- Part4 (Part4.1)
- Part4 (Part4.2)
- nalgae2 (Part4.3)
- nalgae2 (Part4.4)
- Part5 (Part5.1)
- Part5 (Part5.2)
- Earth (Earth.1)
- Part1 (Part1.1)
- Constraints

Applications

- Mechanisms
 - Mechanism.1, DOF=0
 - Joints
 - Rigid.2 (Part3.1,Part4.2)
 - Rigid.3 (Part3.1,Part4.1)
 - Cylindrical.3 (Part3.1,Part2.1)
 - Revolute.4 (Part5.2,Part2.1)
 - Revolute.5 (Part2.1,Part5.1)
 - Revolute.6 (Earth.1,Part1.1)
 - Revolute.7 (Part2.1,Earth.1)
 - Revolute.8 (Part2.1,Part4.4)
 - Revolute.9 (Part4.3,Part2.1)
 - Commands
 - Fix Part (Part 1.1.1)
 - Laws
 - Speeds-Accelerations
 - Simulation
 - Sequences

DMU Kinematics

Kinematics Simulation - Mechanism.1

Mechanism: Mechanism.1

Command	Value 1	Value 2	Value 3
Command.2	-1	1	0.0000
Command.3	-60	180	-60.0000
Command.4	-30	60	60.0000
Command.5	-180	180	-180.0000
Command.6	-360	360	0.0000
Command.7	-360	360	0.0000
Command.8	-52	38	-52.0000
Command.9	-25.3247	64	-25.3247

Activate sensors Plot vectors

Reset Analysis... <<Less

Simulation

Immediate On request

Number of steps: 750

Close

InitialState

04. Difficulty in making

어려운 점



4. Difficulty in making



실제 인공위성 크기 VS Modeling 인공위성의 크기를 조절



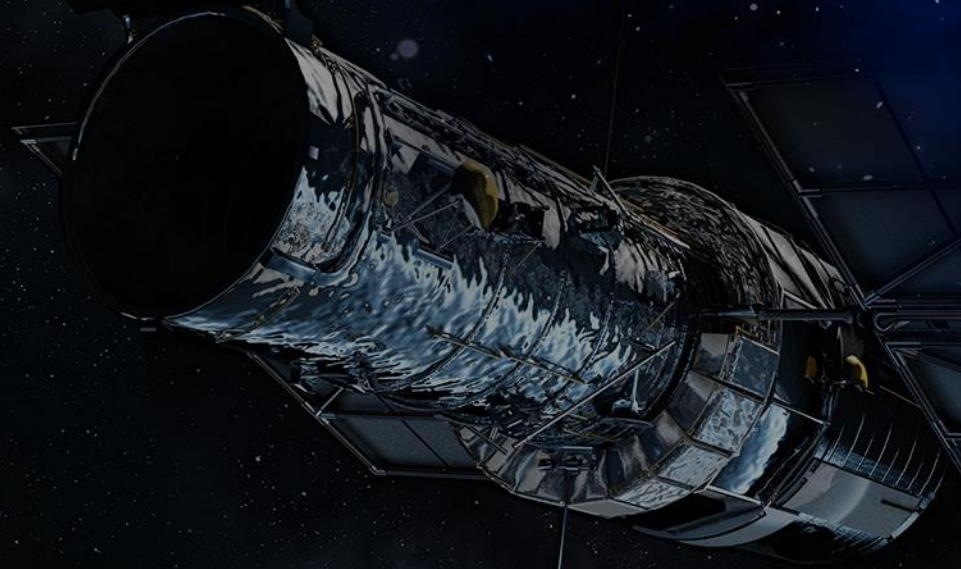
1. 지구와 인공위성의 공전과 자전을 표현하는데 시행착오를 겪음

2. 태양과 지구 인공위성 3개의 part를 Assemble하여 DMU로 만들기까지 여러 시행착오를 겪음



05 Youtube(영상시청 및 질의응답)

링크: https://www.youtube.com/watch?v=9_M6AW0qjn4



6. Reference

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2. Choi.I.Y 2013.08.23 전천후 실용위성 '아리랑5호' 러시아 에서 발사 <https://www.hankyung.com/international/article/2013082319228>
3. 천문우주지식정보 <https://astro.kasi.re.kr/learning/pageView/5138> (지구 사진)
4. O.C.W 12.03.21 태양폭발 우주 잦아진 이유. 사이언스 온. <http://scienceon.hani.co.kr/32723> (태양사진)





THANK YOU