

# K2 흑표

autotank

2024057901 장준희

2024010255 정주영



# 목차



1. 팀 & 주제소개

2. 모델링 과정

3. DMU kinematics

4. 시뮬레이션

5. 결과 고찰

6. Q&A

# 1. 팀 & 주제 소개

팀원 소개

Autotank 선정 이유

주제 설명

# 팀원 소개

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## 장준희

- Part Design
- Assembly Design
- Ppt 제작

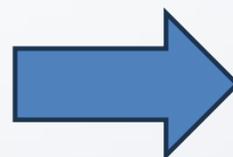
## 정주영

- Part Design
- DMU kinematics
- 시뮬레이션 영상 제작

# 주제 소개

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"전차를 완전 자동화할 수 있을까?"라는 의문점



이 의문점이 현대의 전차 시스템의 자동화에 대한 탐색으로 이어짐

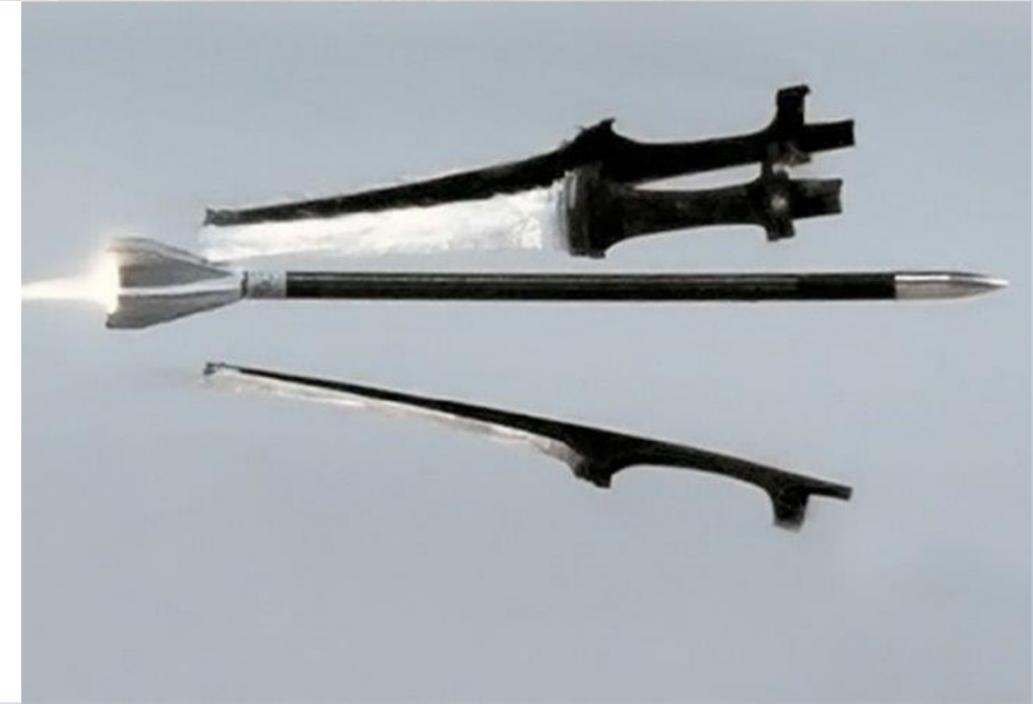
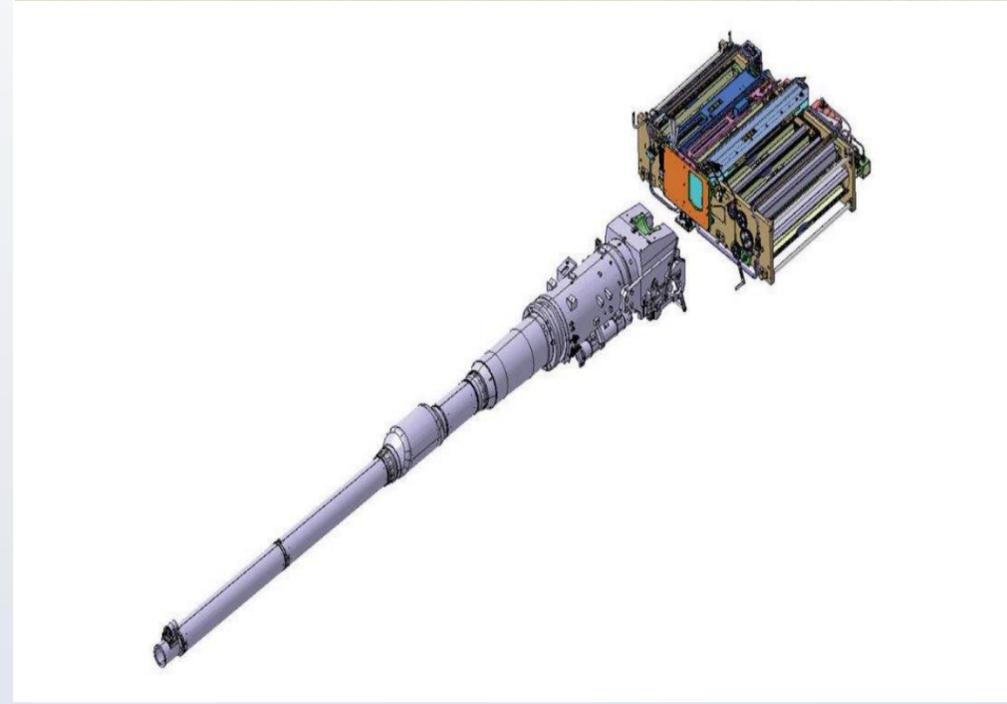
# 주제 소개

## K2 전차의 자동 발사 시스템

자동장전장치  
사격통제 시스템

## 자동장전장치

장전 → 발사 → 이탈피 분리까지의  
연속적인 동작 메커니즘



# Autotank 선정 이유, 목표

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Auto (automation - 자동화)  
Tank (전차)



K2 흑표 전차의 외형 구현



자동장전장치 구현



날개안정분리철갑탄의 발사  
구현



날개안정분리철갑탄의 이탈피 구현

## 2. 모델링 과정

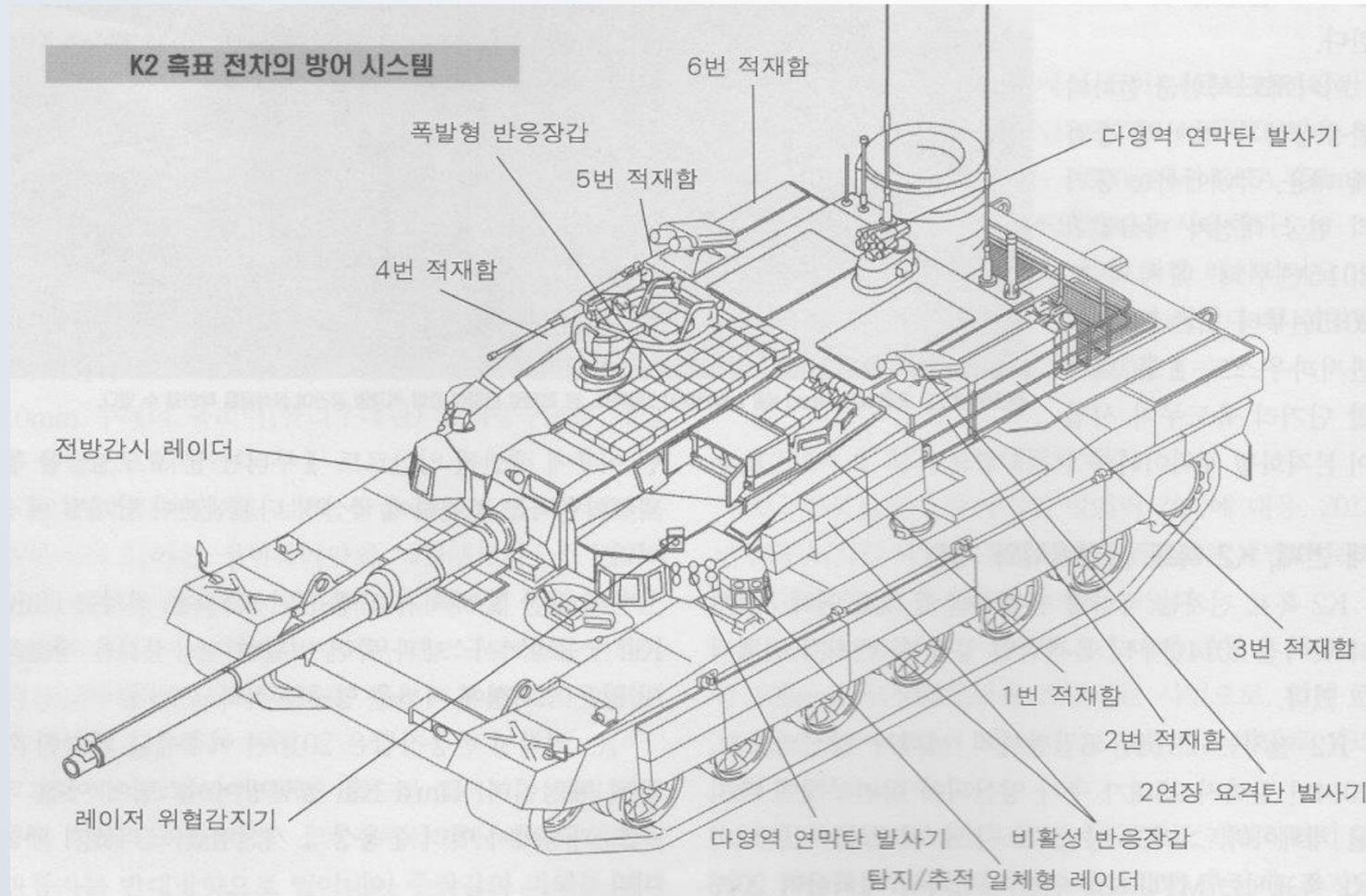
참고 자료

Part design

Generative shape design

Assembly

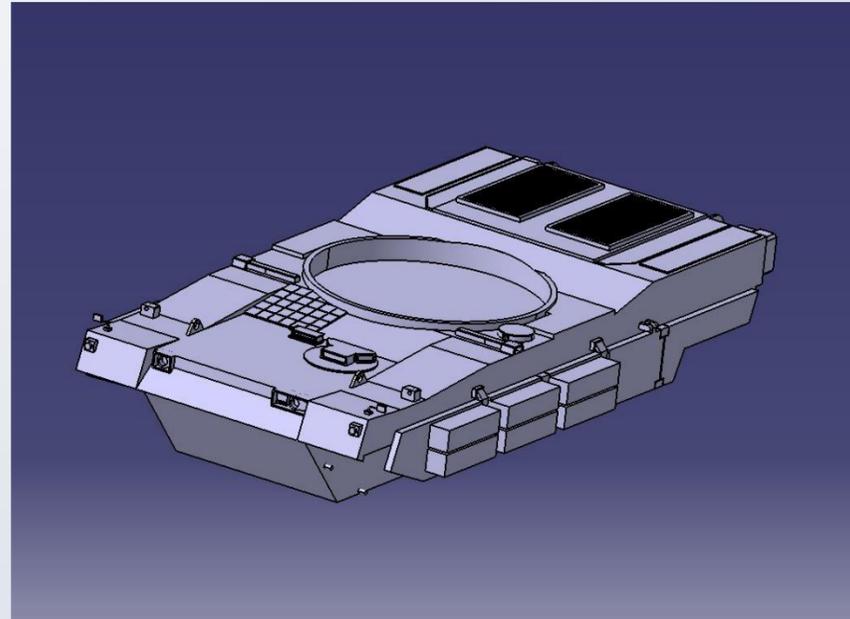
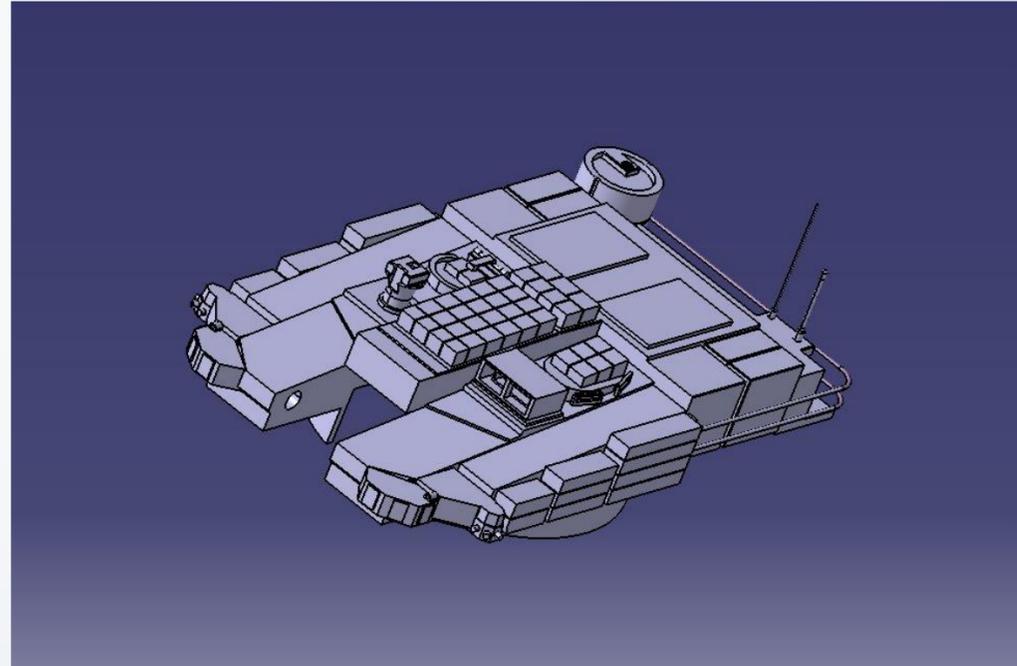
# 참고 자료



# 모델링 과정

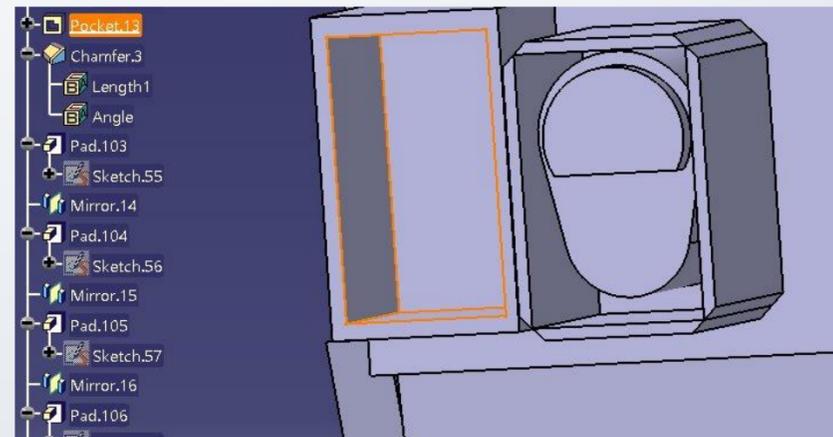
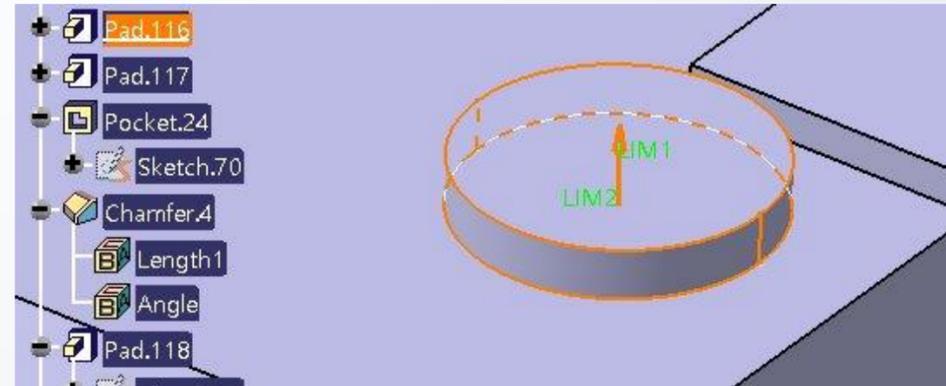
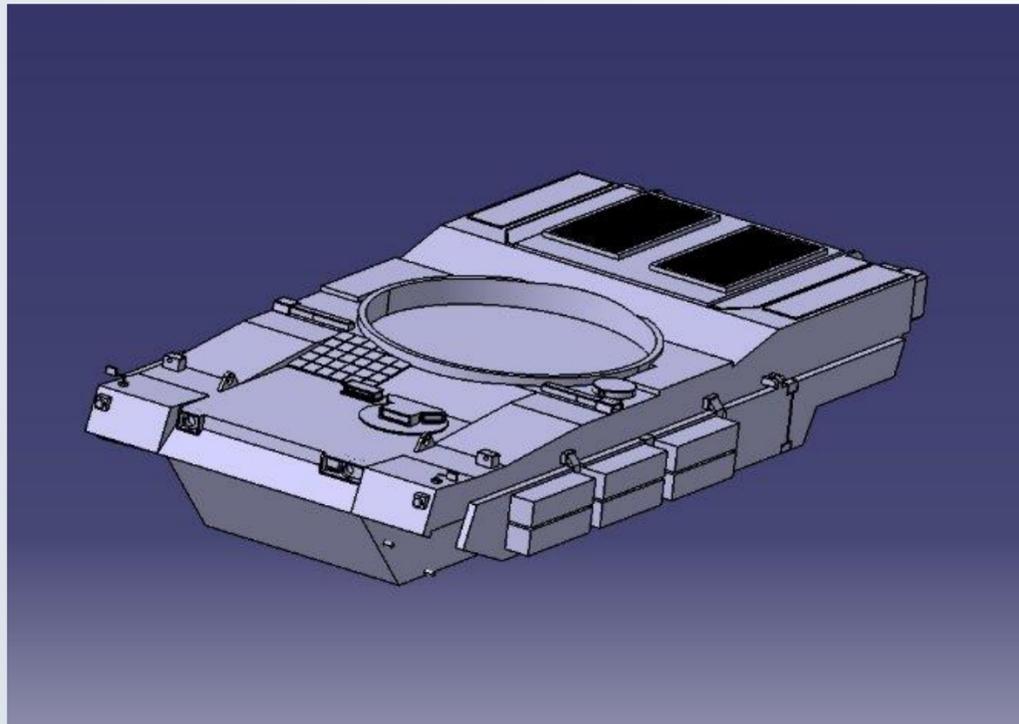
- K2\_Tank
- tandol (tandol.1)
- Autometric\_reloader (Autometric\_reloader.1)
- tandol (tandol.2)
- tandol (tandol.3)
- tandol (tandol.4)
- tandol (tandol.5)
- tandol (tandol.6)
- tandol (tandol.7)
- tandol (tandol.8)
- tandol (tandol.9)
- tandol (tandol.10)
- tandol (tandol.12)
- tandol (tandol.13)
- Pogu (Pogu.1)
- Posin (Posin.1)
- flybullet (flybullet.1)
- Gonye (Gonye.1)
- sabot (sabot.1)
- tanpi (tanpi.1)
- sabot (sabot.2)
- dupge (dupge.1)
- Part1 (Tank\_head)
- Under\_boddy (Tank\_body)
- topni (topni.1)
- wheel 1 (wheel 1.1)

- sssss (Chain.1)
- wheel 1 (wheel 1.2)
- wheel 1 (wheel 1.3)
- wheel 1 (wheel 1.4)
- wheel 1 (wheel 1.5)
- wheel 1 (wheel 1.6)
- wheel 1 (wheel 1.7)
- wheel 1 (wheel 1.8)
- wheel 1 (wheel 1.9)



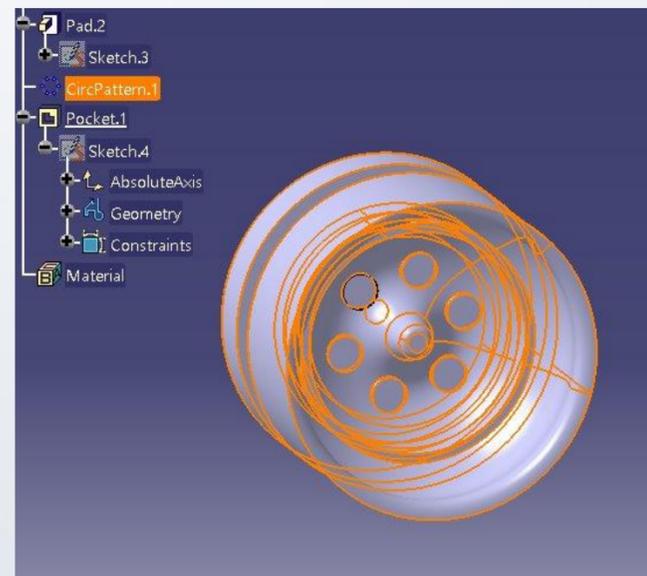
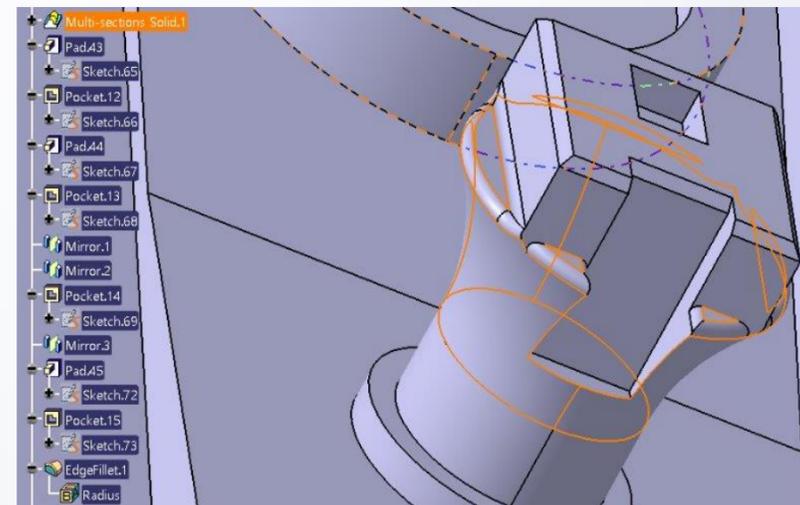
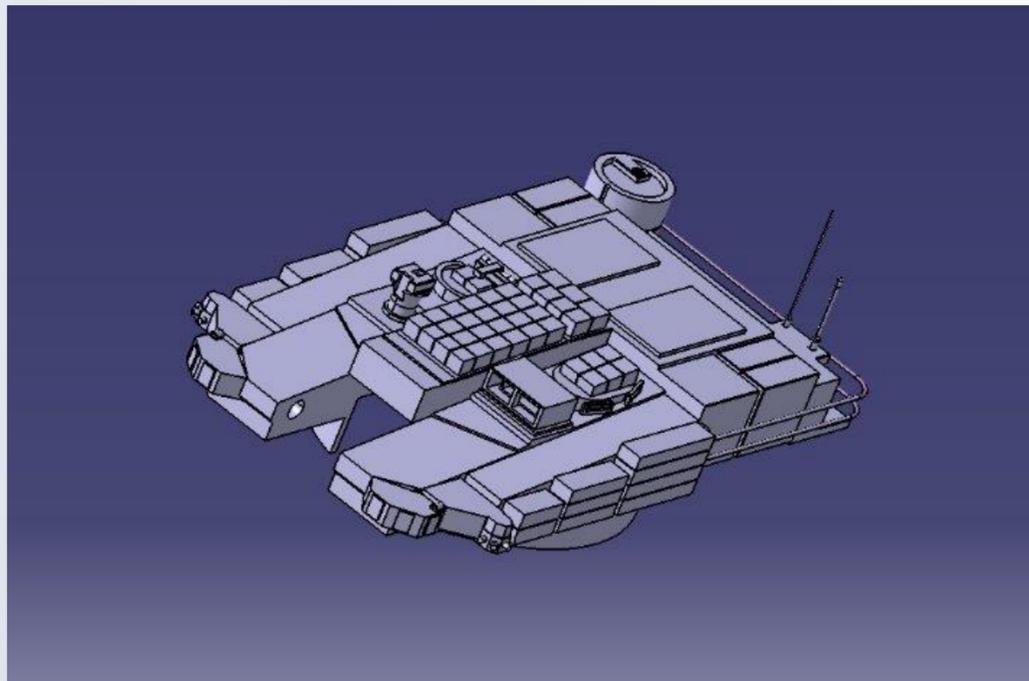
# 모델링 과정

Part design



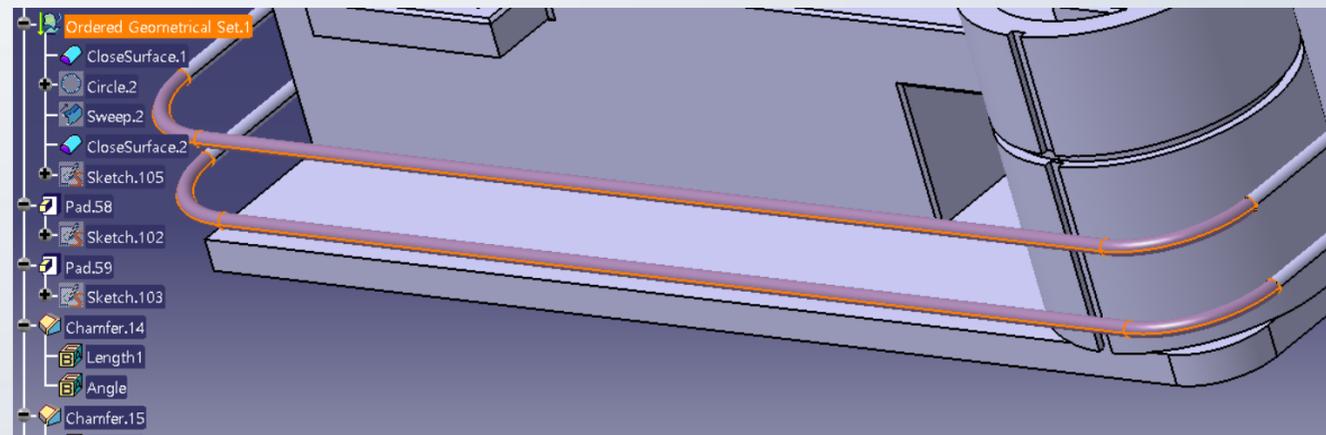
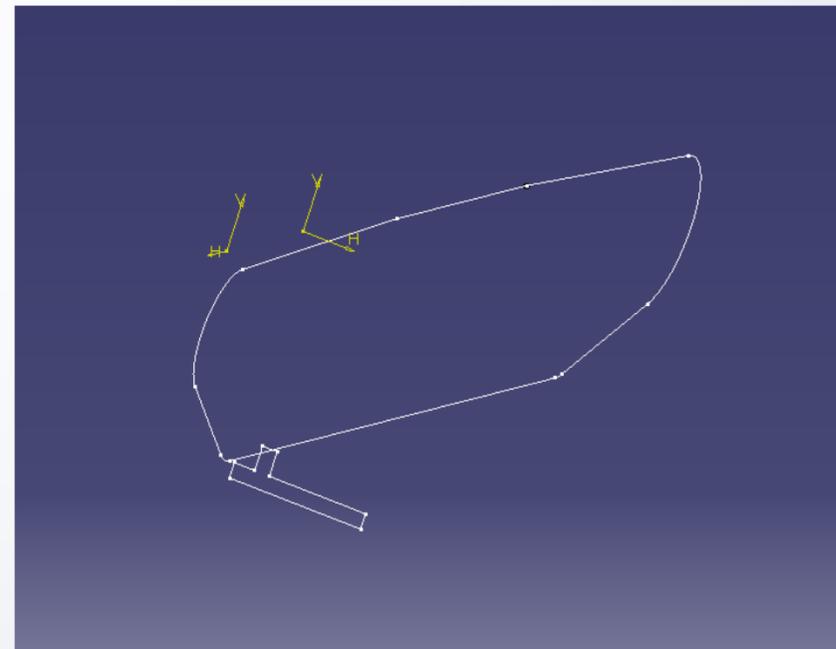
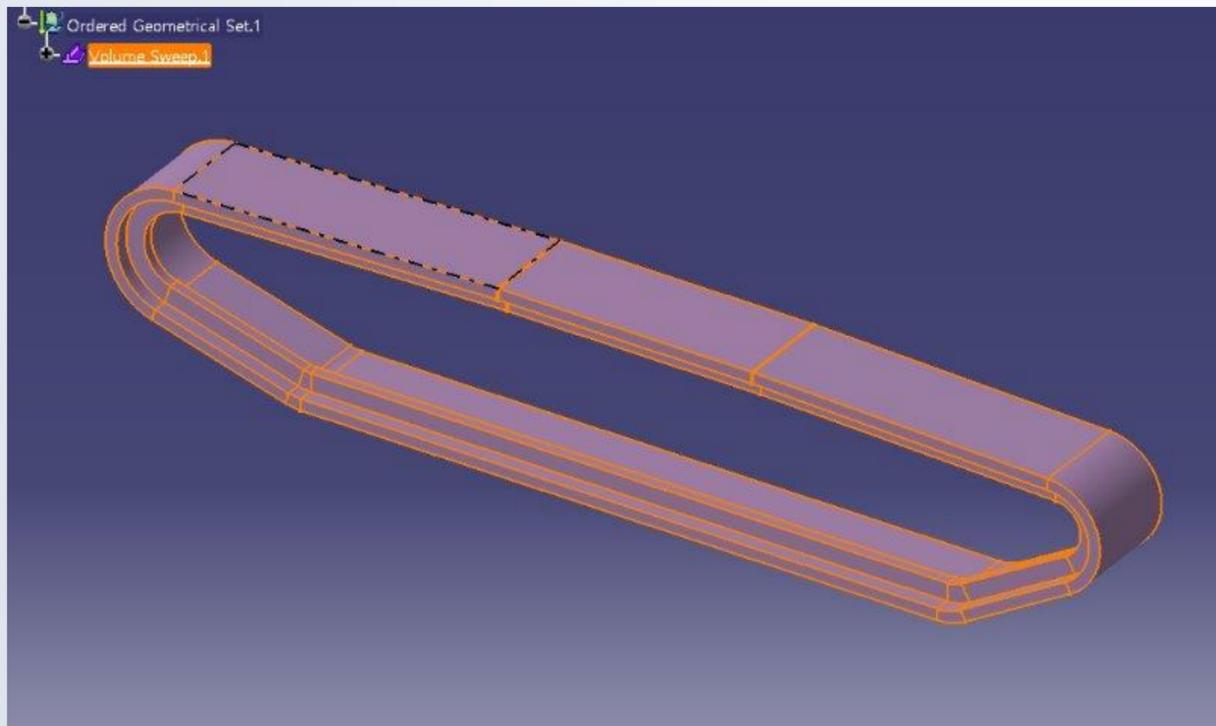
# 모델링 과정

Part design



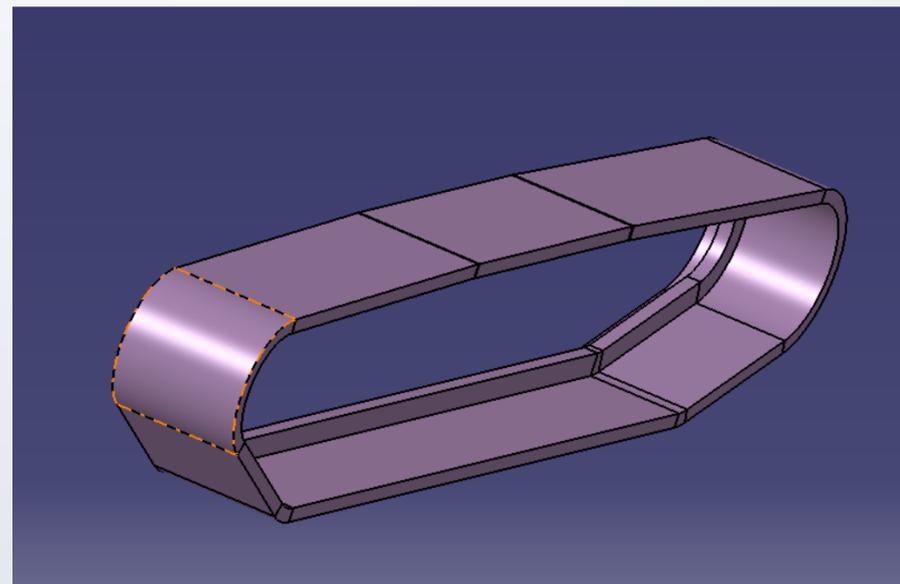
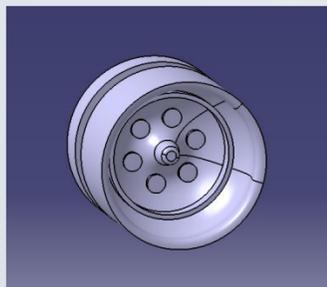
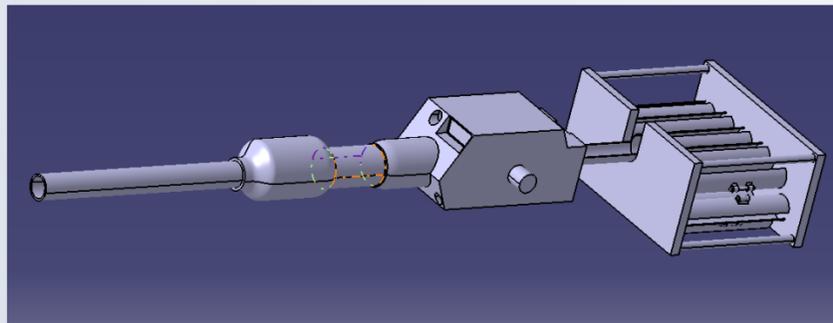
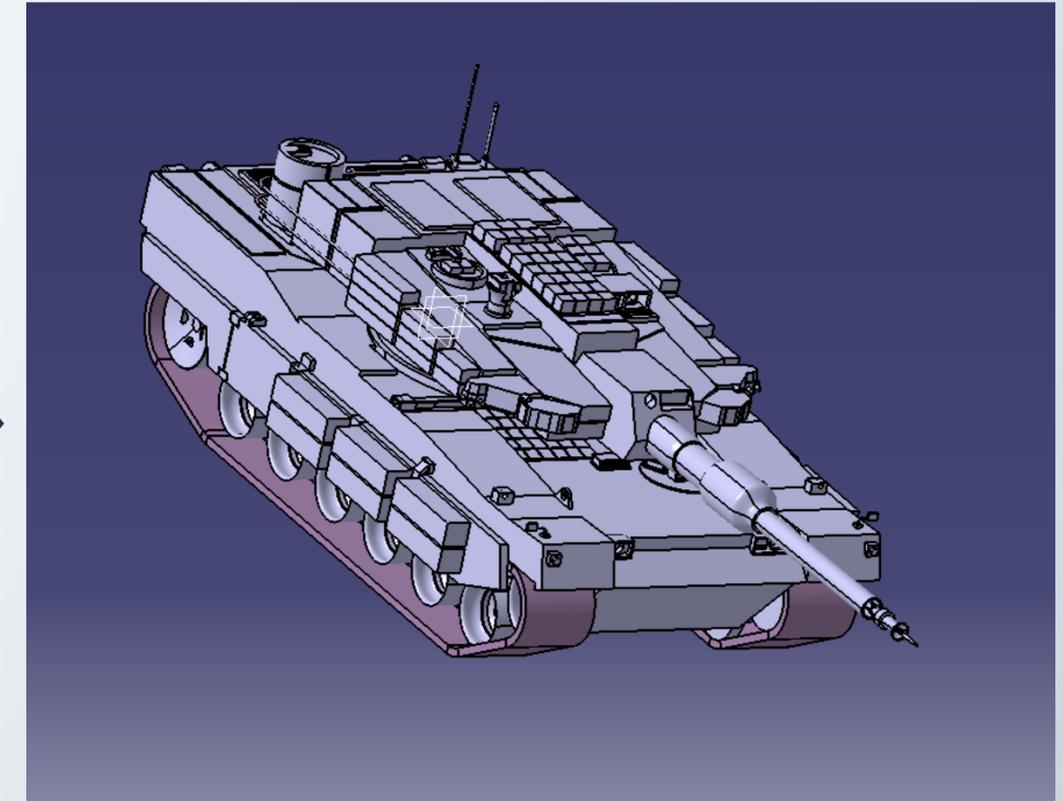
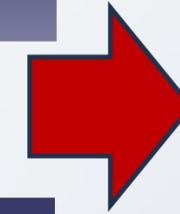
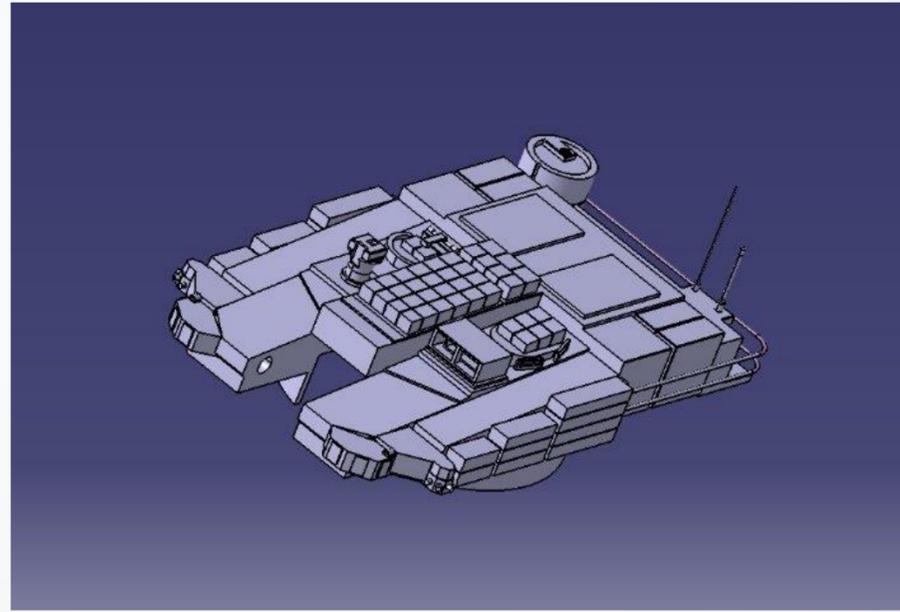
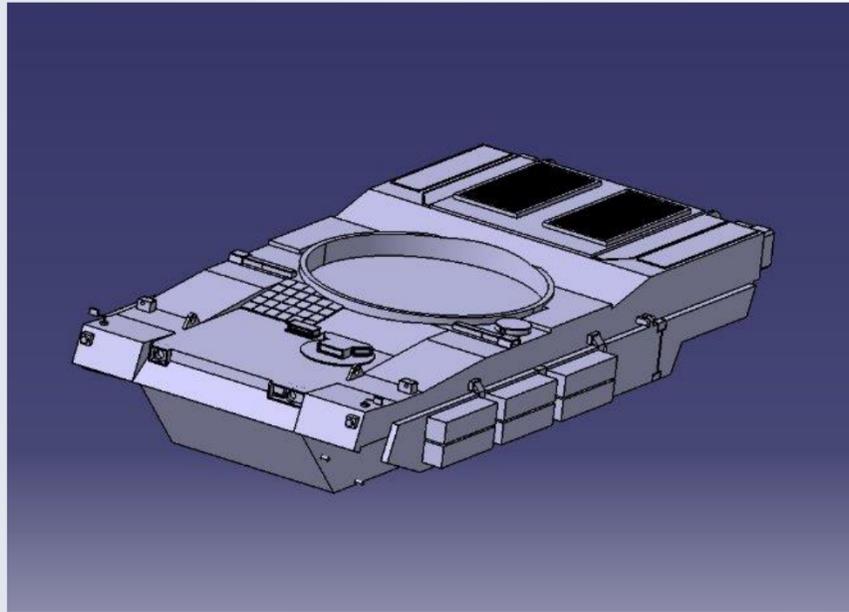
# 모델링 과정

Generative shape design

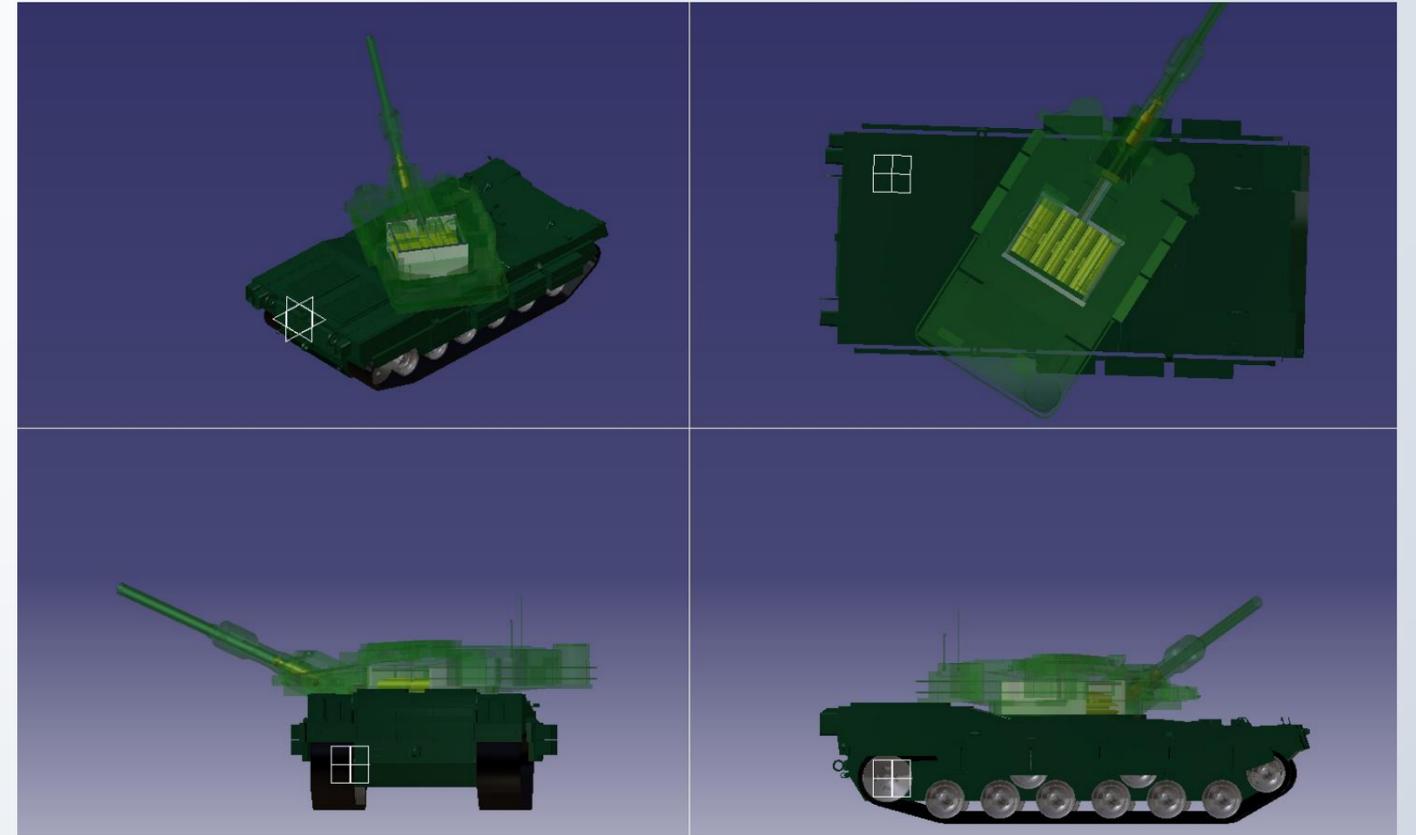
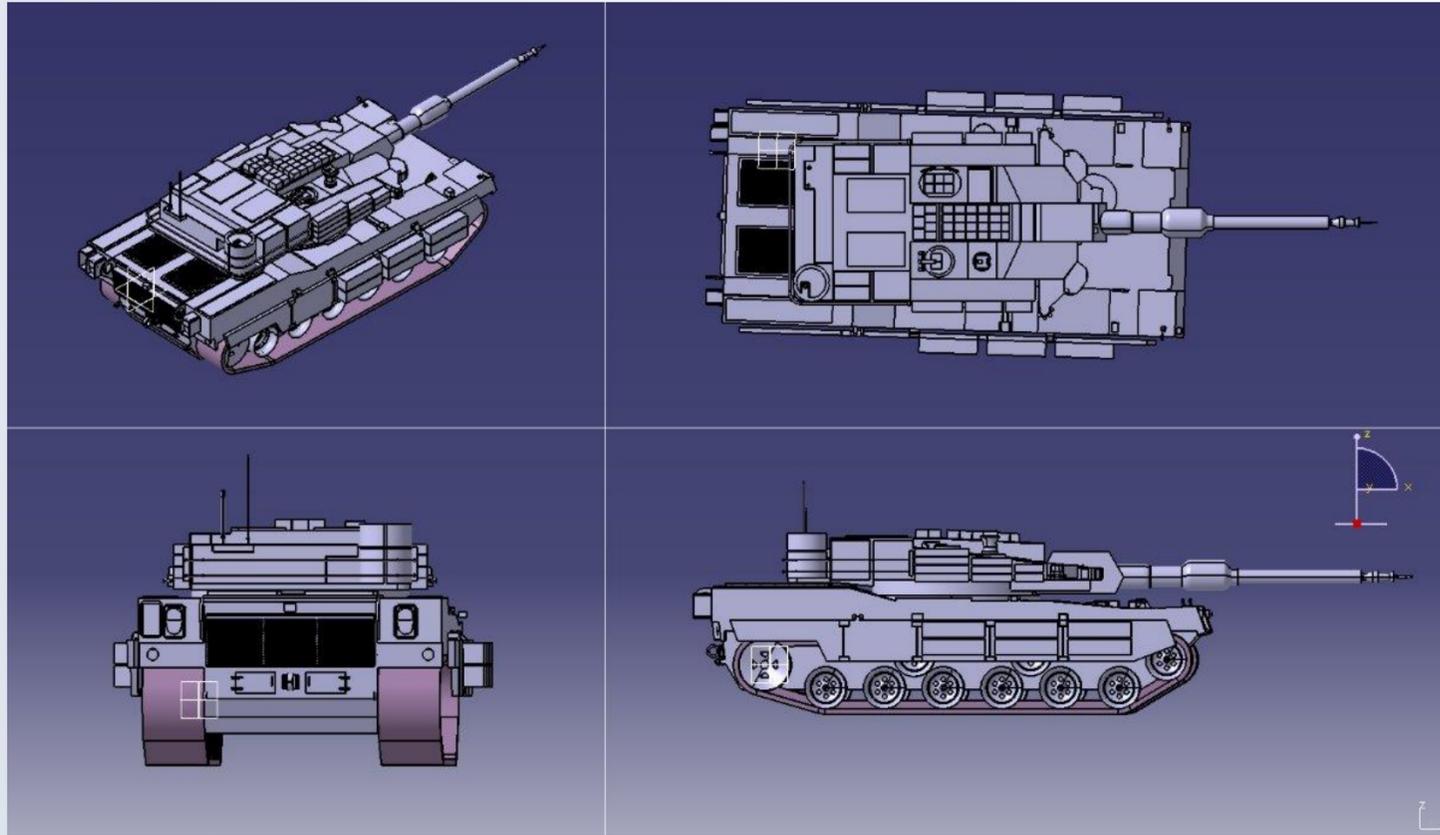


# 모델링 과정

Assembly



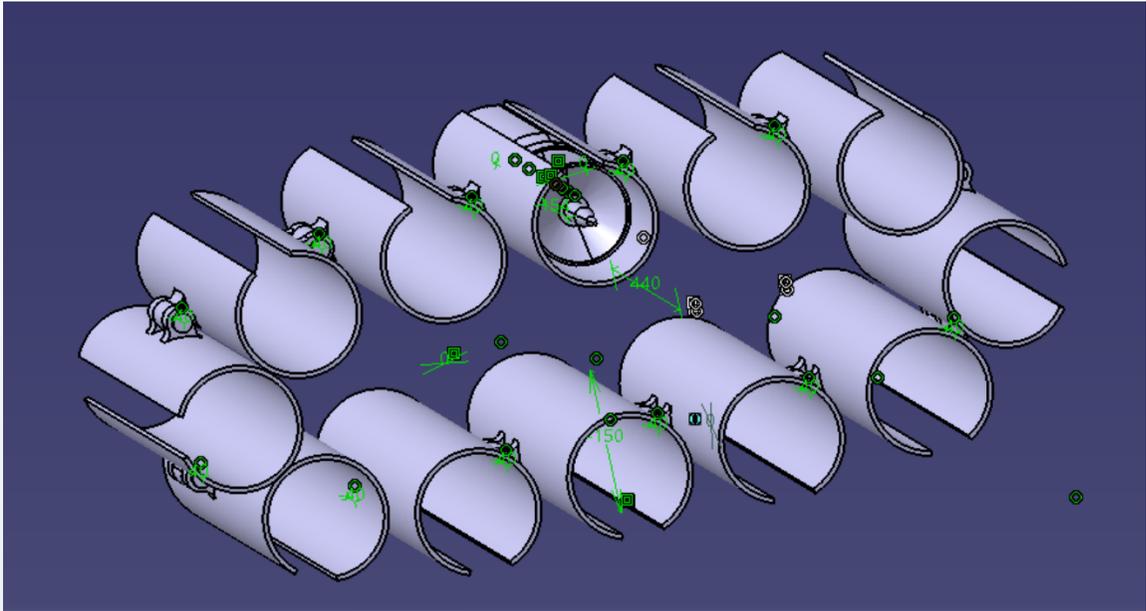
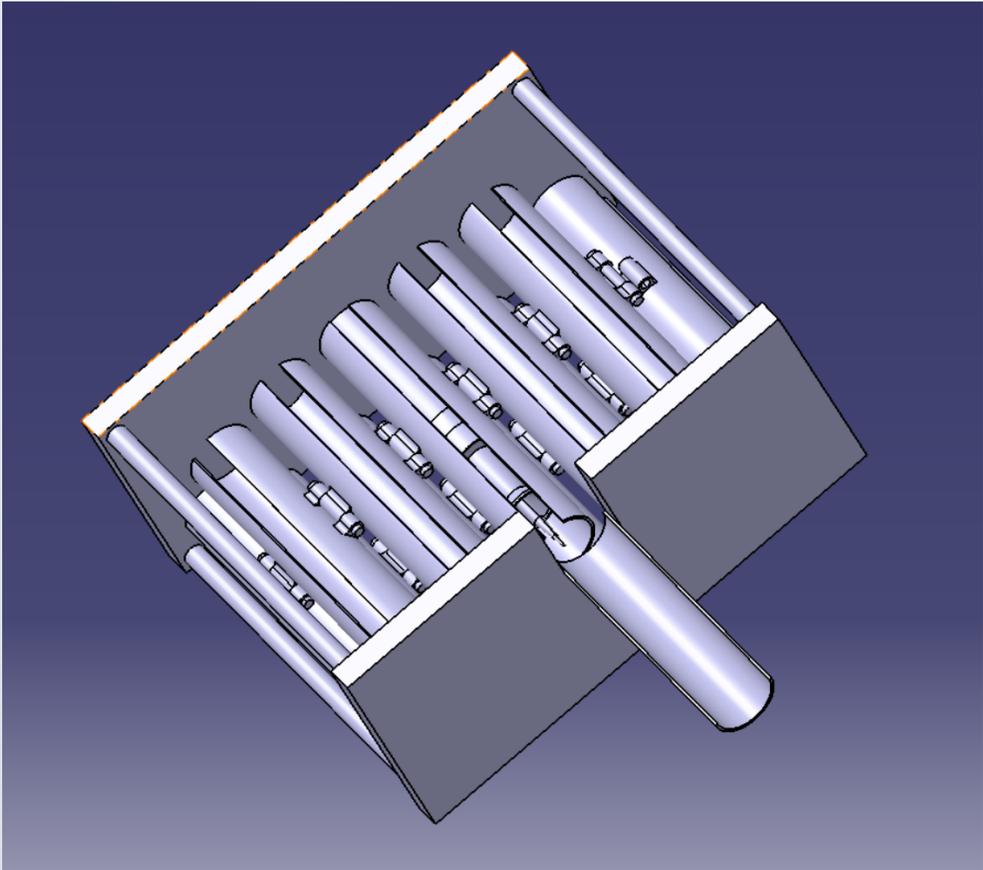
# 전체 모습



### **3. DMU kinematics**

# DMU kinematics

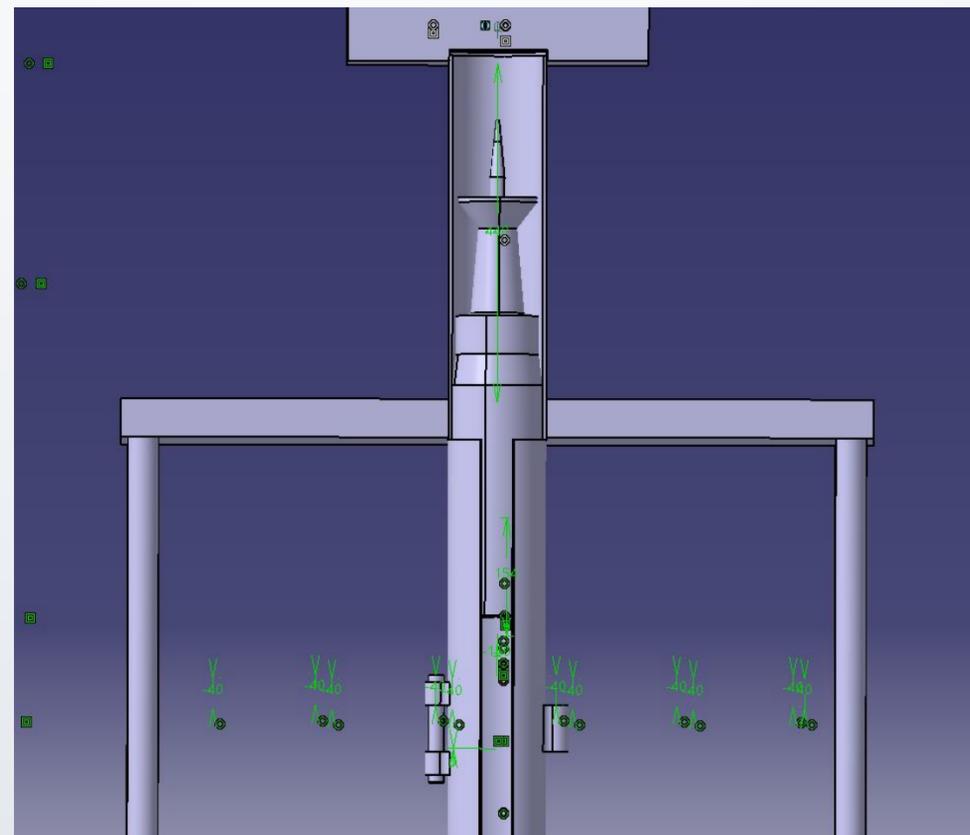
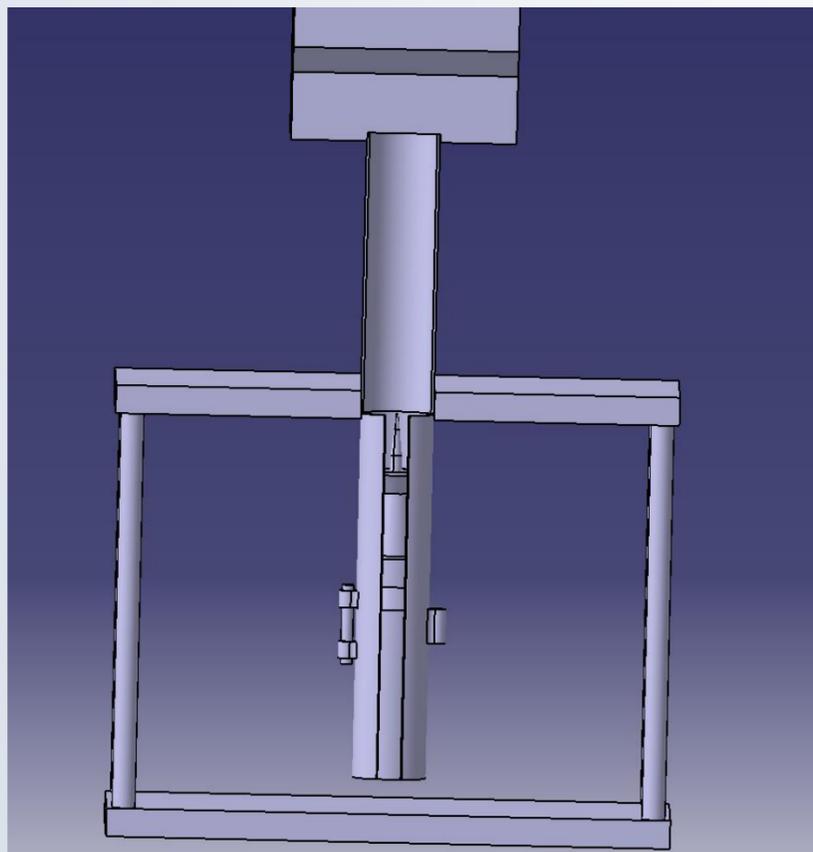
 Bullet\_Selecting\_Mechanism, DOF=0



- Point Curve.1 (tandol.1,Autometric\_reloader.1)
- Point Curve.2 (tandol.1,Autometric\_reloader.1)
- Slide Curve.3 (Autometric\_reloader.1,tandol.1)
- Revolute.4 (tandol.2,tandol.1)
- Point Curve.5 (tandol.2,Autometric\_reloader.1)
- Revolute.6 (tandol.3,tandol.2)
- Point Curve.7 (tandol.3,Autometric\_reloader.1)
- Revolute.8 (tandol.4,tandol.3)
- Point Curve.9 (tandol.4,Autometric\_reloader.1)
- Revolute.10 (tandol.5,tandol.4)
- Point Curve.11 (tandol.5,Autometric\_reloader.1)
- Revolute.12 (tandol.6,tandol.5)
- Point Curve.13 (tandol.6,Autometric\_reloader.1)
- Revolute.14 (tandol.6,tandol.7)
- Point Curve.15 (tandol.7,Autometric\_reloader.1)
- Revolute.16 (tandol.8,tandol.7)
- Point Curve.17 (tandol.8,Autometric\_reloader.1)
- Revolute.18 (tandol.9,tandol.8)
- Point Curve.19 (tandol.9,Autometric\_reloader.1)
- Revolute.20 (tandol.10,tandol.9)
- Point Curve.21 (tandol.10,Autometric\_reloader.1)
- Revolute.22 (tandol.12,tandol.10)
- Point Curve.23 (tandol.12,Autometric\_reloader.1)
- Revolute.24 (tandol.13,tandol.12)
- Point Curve.25 (tandol.13,Autometric\_reloader.1)
- Rigid.26 (tandol.3,tanpi.1)
- Rigid.27 (tandol.3,sabot.2)
- Rigid.28 (tandol.3,sabot.2)
- Rigid.29 (tandol.3,flybullet.1)
- Rigid.30 (tandol.3,Gonye.1)
- Rigid.31 (sabot.1,tandol.3)

# DMU kinematics

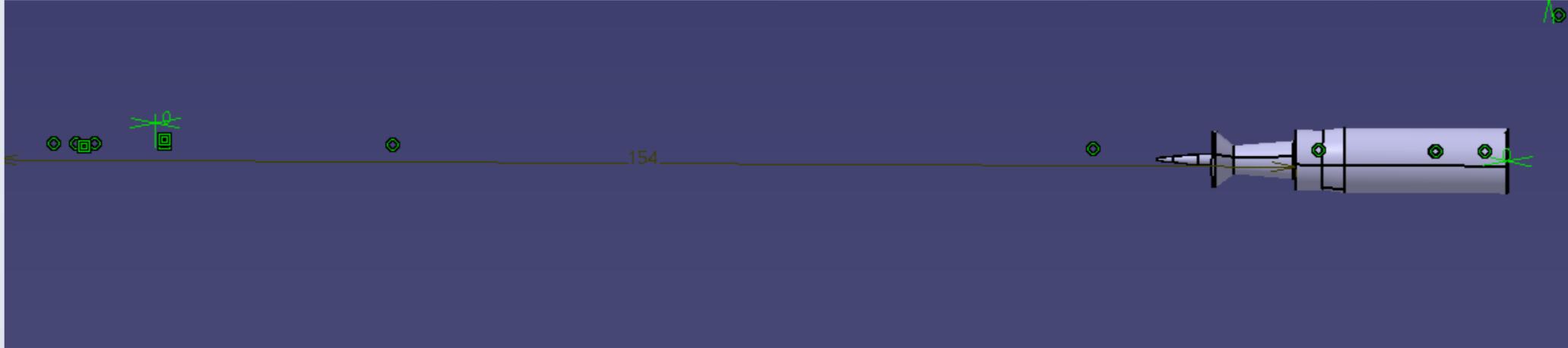
 Bullet\_Reloading\_Mechanism, DOF=0



- Joints
- Rigid.1 (Automatic\_reloader.1,tandol.3)
  - Rigid.2 (sabot.2,tanpi.1)
  - Rigid.3 (sabot.2,sabot.1)
  - Rigid.4 (sabot.2,Gonye.1)
  - Rigid.5 (sabot.2,flybullet.1)
  - Cylindrical.6 (Automatic\_reloader.1,tanpi.1)
  - Rigid.7 (Automatic\_reloader.1,Posin.1)
  - Prismatic.8 (dupge.1,Posin.1)

# DMU kinematics

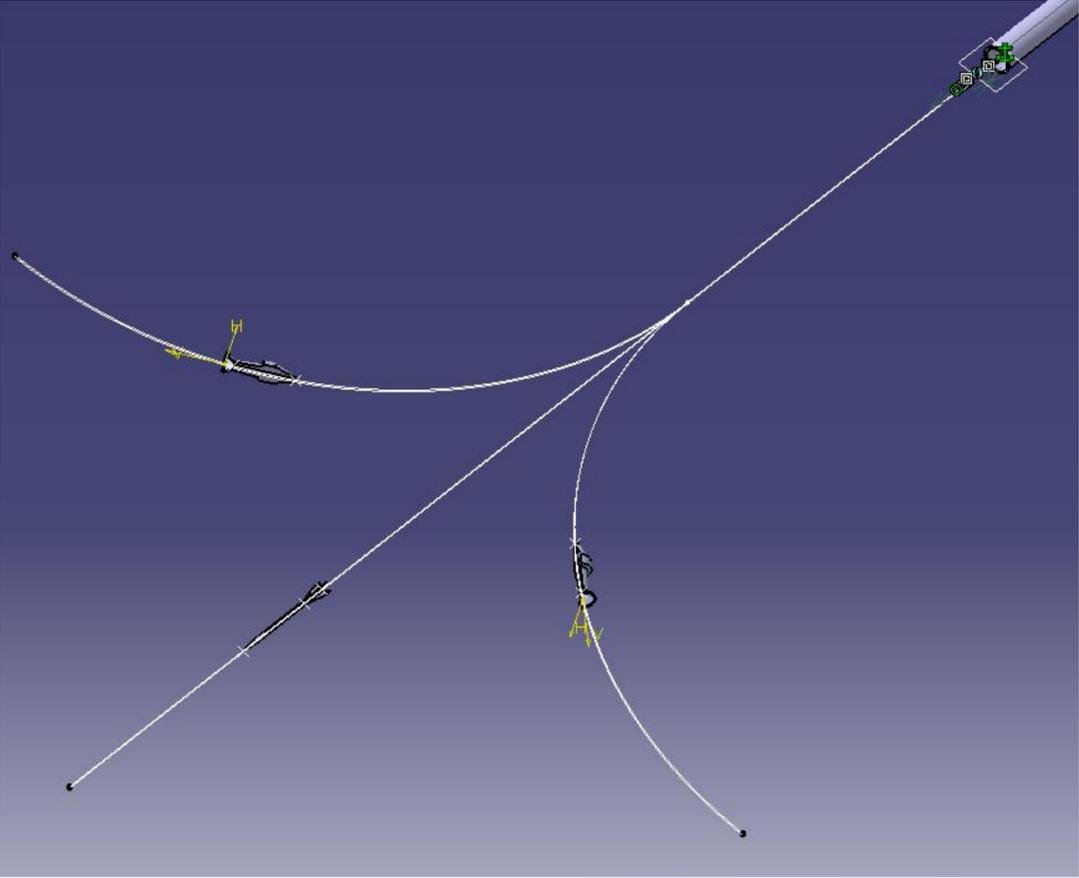
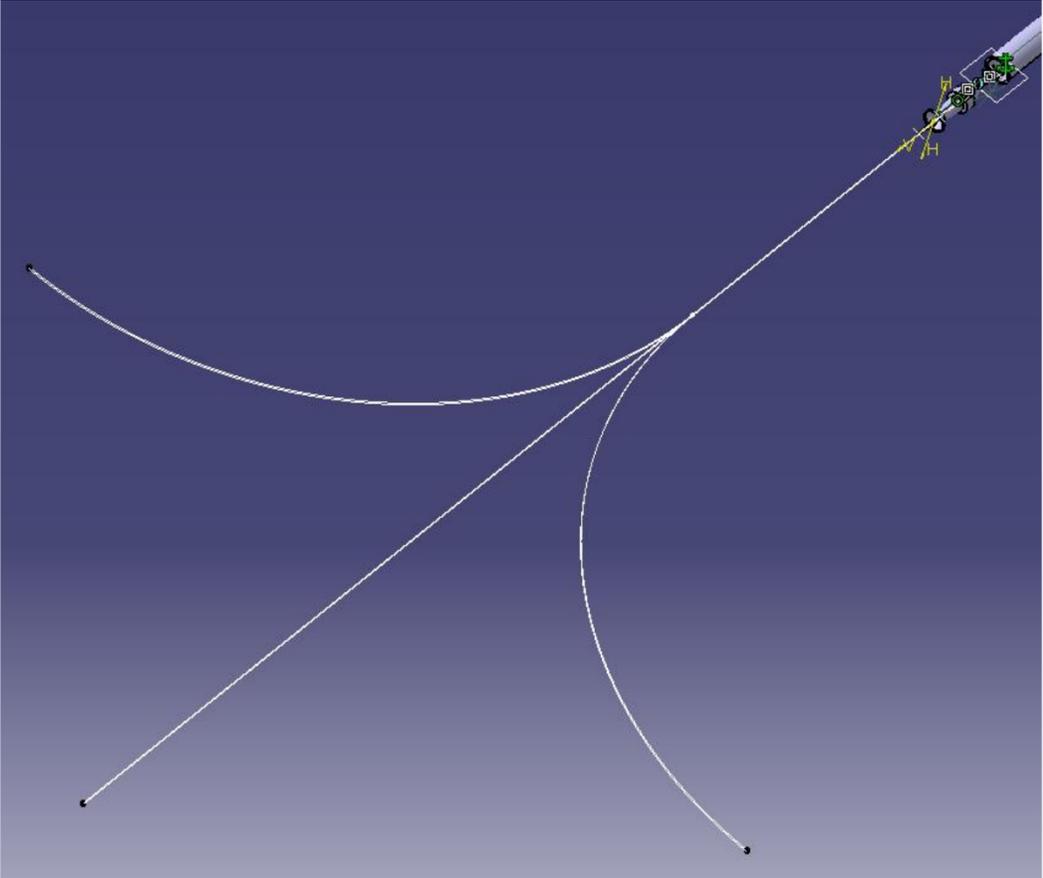
Bullet\_shot\_line1, DOF=0



- Joints
  - Rigid.1 (tanpi.1,Posin.1)
  - Rigid.2 (sabot.2,sabot.1)
  - Rigid.3 (sabot.2,flybullet.1)
  - Rigid.4 (tanpi.1,Gonye.1)
  - Cylindrical.6 (tanpi.1,sabot.1)
  - Rigid.7 (Automatic\_reloader.1,Posin.1)
  - Cylindrical.7 (Posin.1,Pogu.1)

# DMU kinematics

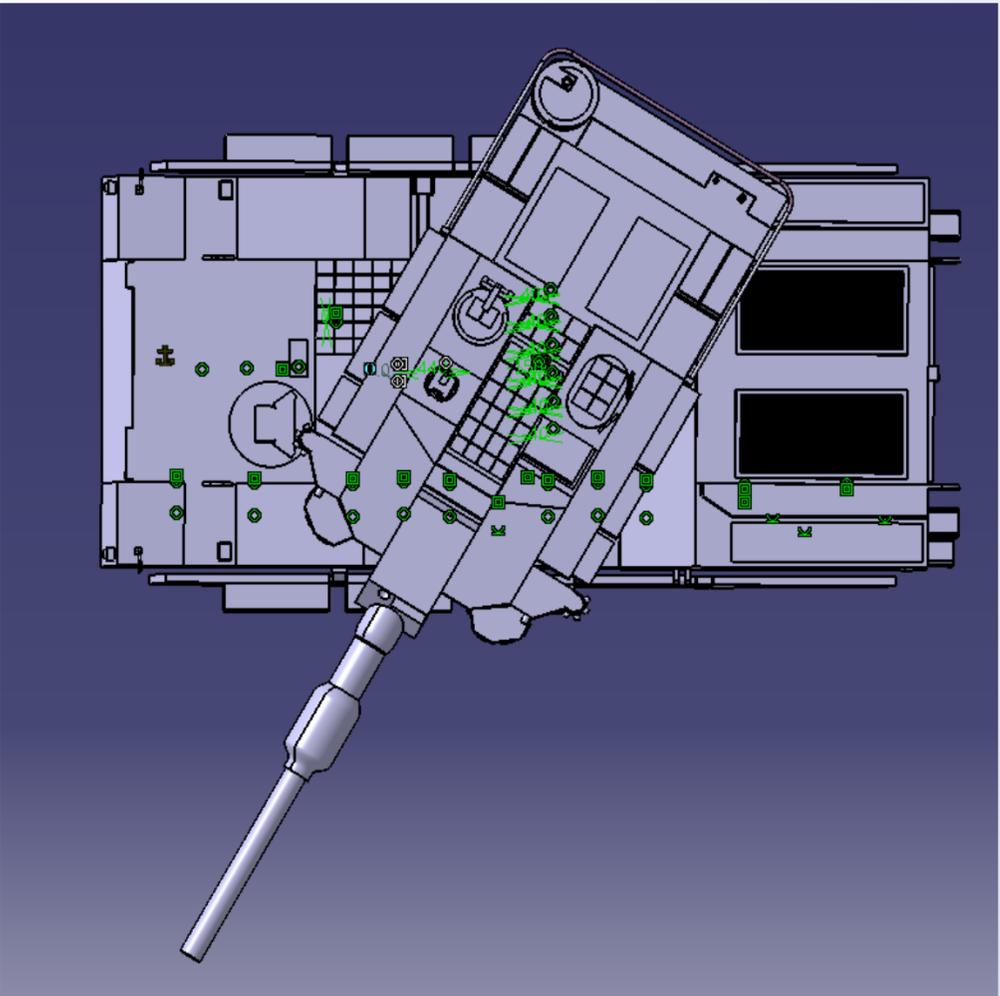
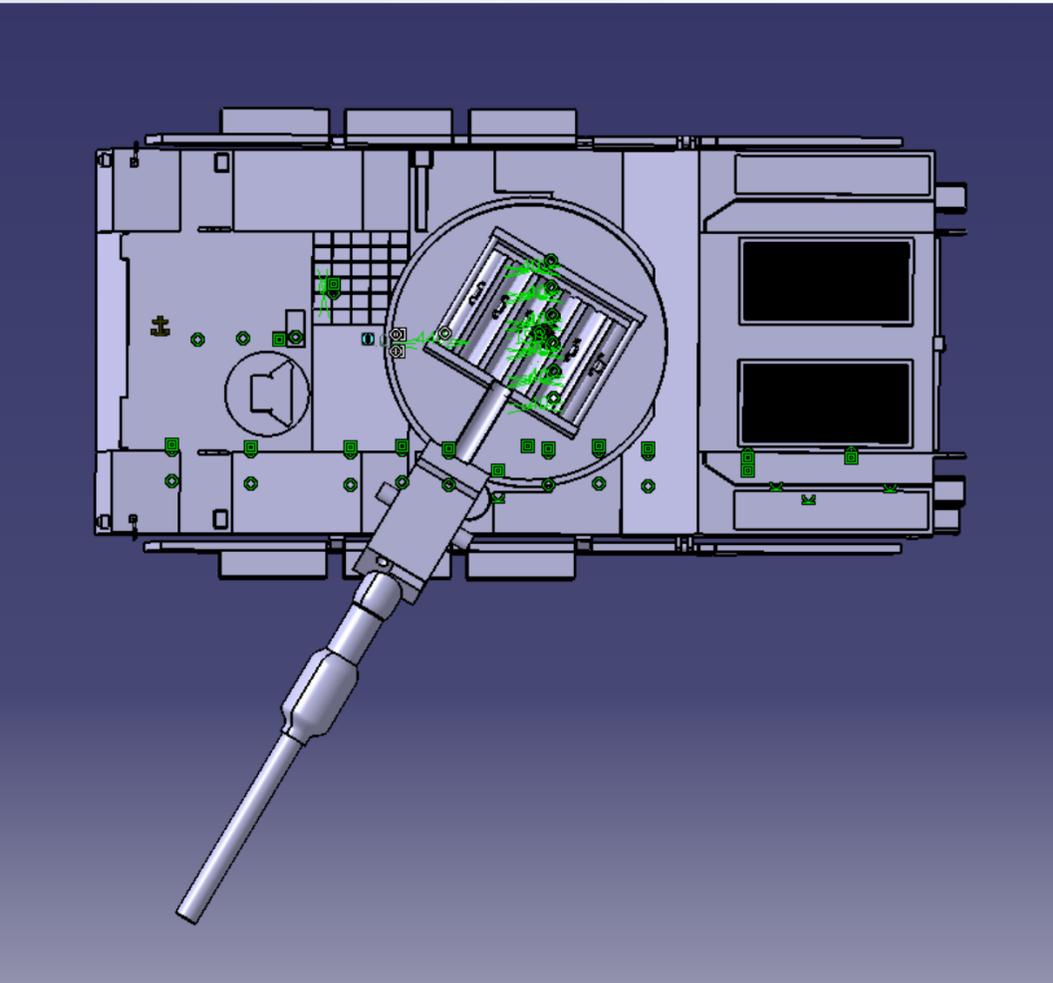
Bullet\_shot\_line2, DOF=0



- Joints
- Point Curve.1 (flybullet.1,Pogu.1)
  - Point Curve.2 (flybullet.1,Pogu.1)
  - Point Curve.3 (flybullet.1,Pogu.1)
  - Point Curve.4 (sabot.2,Pogu.1)
  - Point Curve.5 (sabot.2,Pogu.1)
  - Point Curve.6 (sabot.2,Pogu.1)
  - Point Curve.7 (sabot.1,Pogu.1)
  - Point Curve.8 (sabot.1,Pogu.1)
  - Point Curve.9 (sabot.1,Pogu.1)

# DMU kinematics

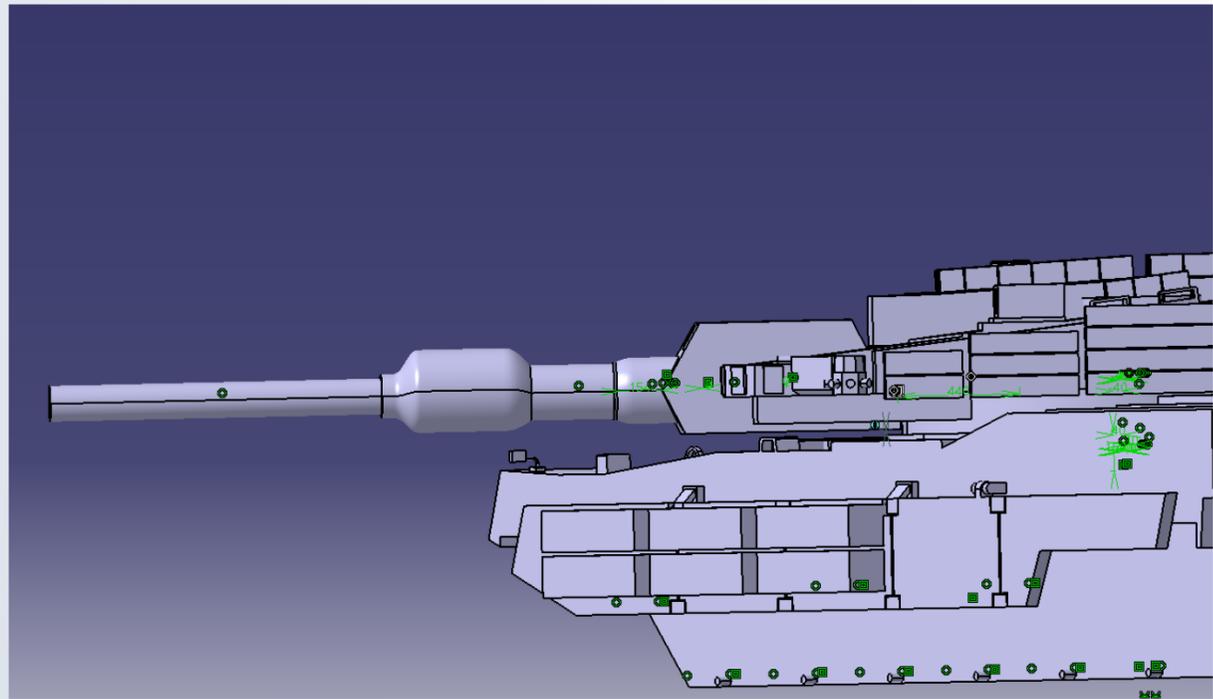
Head\_angle\_Mechanism, DOF=0



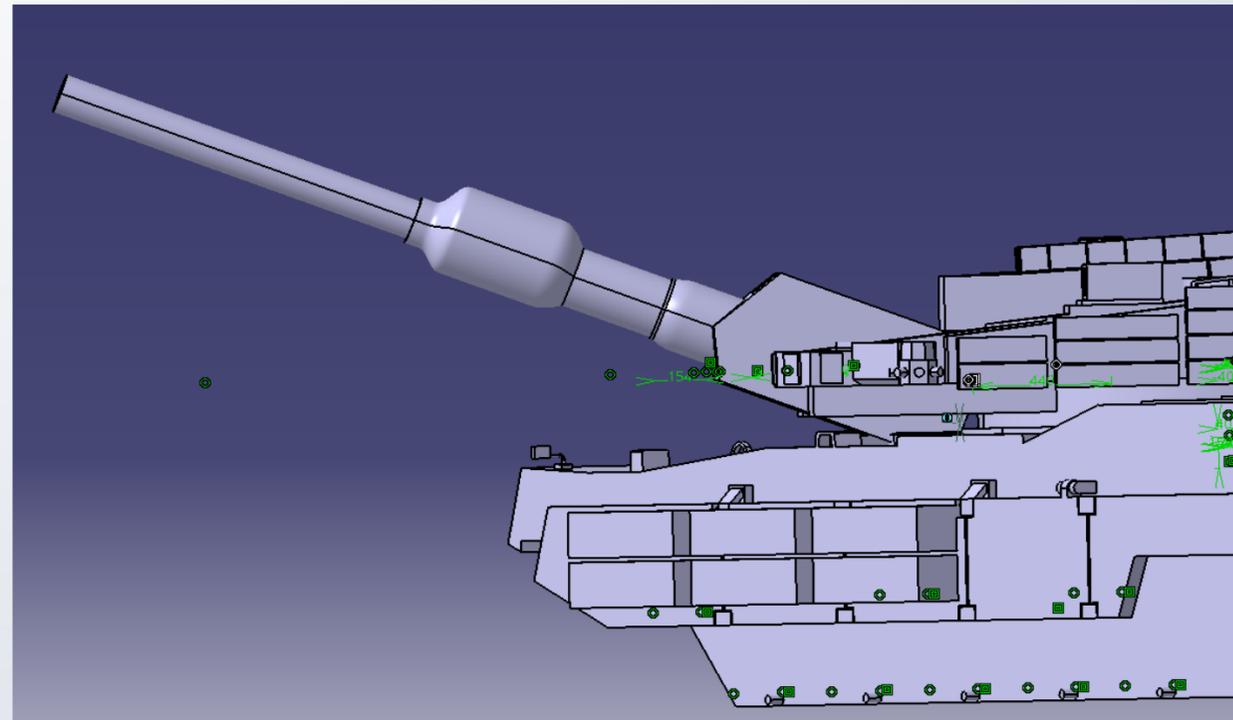
- Joints
- Rigid.1 (Tank\_head,Posin.1)
  - Rigid.2 (Tank\_head,Pogu.1)
  - Rigid.4 (Tank\_head,Autometic\_reloader.1)
  - Rigid.5 (Tank\_head,tandol.1)
  - Rigid.6 (Tank\_head,tandol.2)
  - Rigid.8 (Tank\_head,dupge.1)
  - Rigid.9 (Tank\_head,tandol.4)
  - Rigid.10 (Tank\_head,tandol.5)
  - Rigid.11 (tandol.6,Tank\_head)
  - Rigid.12 (Tank\_head,tandol.7)
  - Rigid.13 (Tank\_head,tandol.8)
  - Rigid.14 (Tank\_head,tandol.9)
  - Rigid.15 (Tank\_head,tandol.10)
  - Rigid.16 (Tank\_head,tandol.12)
  - Rigid.17 (Tank\_head,tandol.13)
  - Rigid.18 (Tank\_head,tandol.3)
  - + Rigid.19 (Tank\_head,flybullet.1)
  - + Rigid.20 (Tank\_head,Gonye.1)
  - + Rigid.21 (Tank\_head,sabot.1)
  - + Rigid.22 (Tank\_head,tanpi.1)
  - + Rigid.23 (Tank\_head,sabot.2)
  - + Rigid.24 (Tank\_head,dupge.1)
  - + Revolute.23 (Tank\_body,Tank\_head)

# DMU kinematics

 Posin\_angle\_Mechanism, DOF=0



- Joints
- Revolute.1 (Tank\_head,Posin.1)
  - Rigid.2 (Posin.1,Pogu.1)
  - Rigid.3 (Posin.1,dupge.1)
  - Rigid.4 (Posin.1,flybullet.1)
  - Rigid.5 (Posin.1,Gonye.1)
  - Rigid.6 (Posin.1,sabot.1)
  - Rigid.7 (Posin.1,tanpi.1)
  - Rigid.8 (Posin.1,sabot.2)



## 4. 시뮬레이션

<https://youtu.be/0Aod-KwI5fg>

## 4. 결과 고찰

아쉬웠던 점

느낀점

# 아쉬웠던 점

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## 전차의 무한궤도 구현

다수의 부품과 복잡한 시뮬레이션으로 인해 컴퓨터가 과부하되어 실행이 어려움, 구현 시간의 제약 존재로 바퀴의 움직임을 구현하지 못함

## 모델링 과정

전차의 정확한 치수를 알지 못함

## Edit sequence

Edit sequence 기능을 작동시키면 컴퓨터가 과부화되어 시뮬레이션들을 합쳐서 작동 시키지 못함

# 느낀점

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도구에 대한 이해도가 크게 향상

CAD 설계가 실제 제품 개발에 어떻게 연결되는지를 체감

부품 간 관계 설정과 시간 축 연동의 중요성을 느낌

복잡한 기계 구조를 직접 설계하고 시뮬레이션하면서,  
전차 시스템의 동작 원리를 보다 깊이 이해함

## 5. Q&A

감사합니다