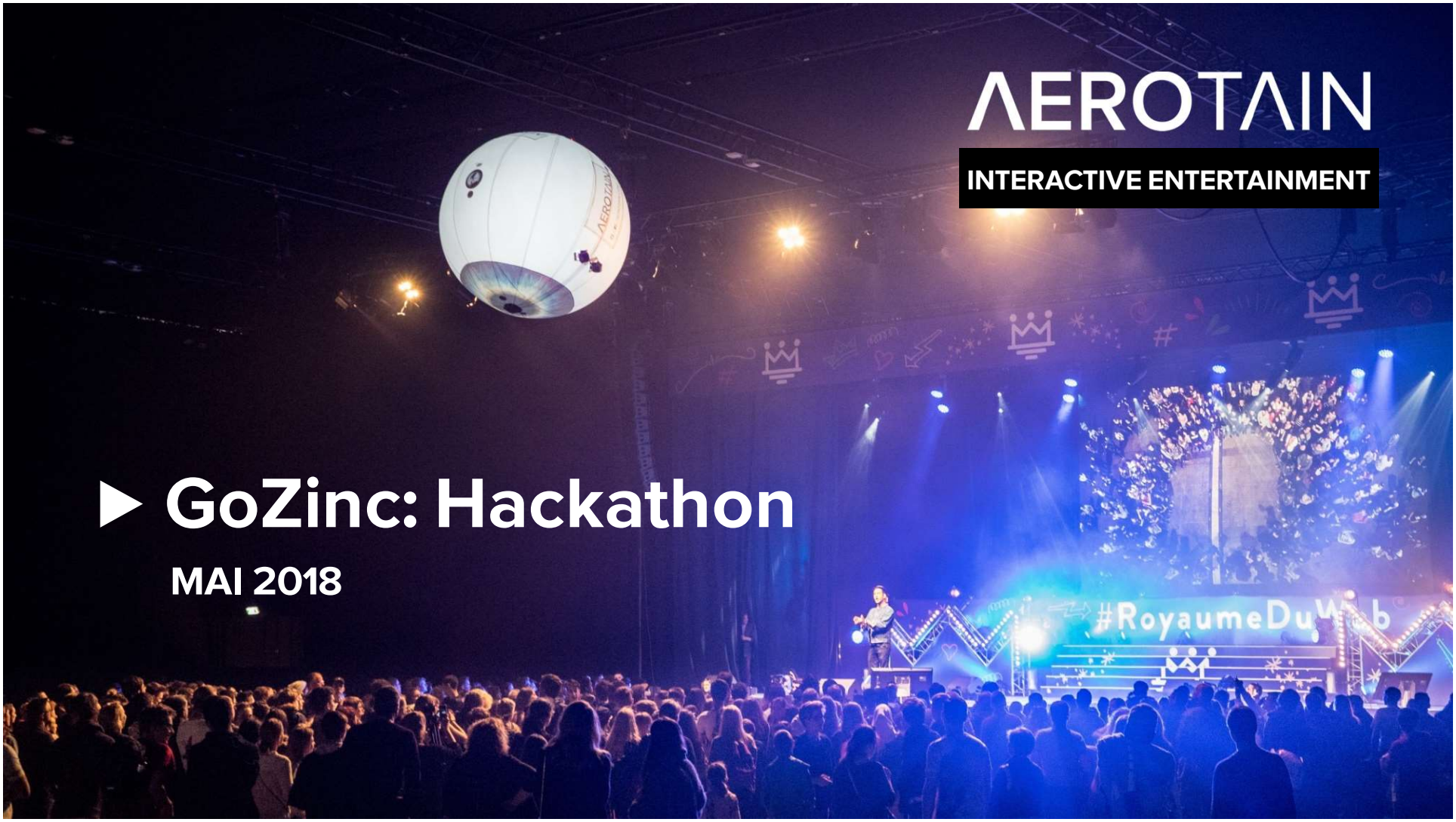
AEROTAIN
INTERACTIVE ENTERTAINMENT
▶ GoZinc: Hackathon
MAI 2018

▶ ADD VALUE FOR EVENT STAKEHOLDERS

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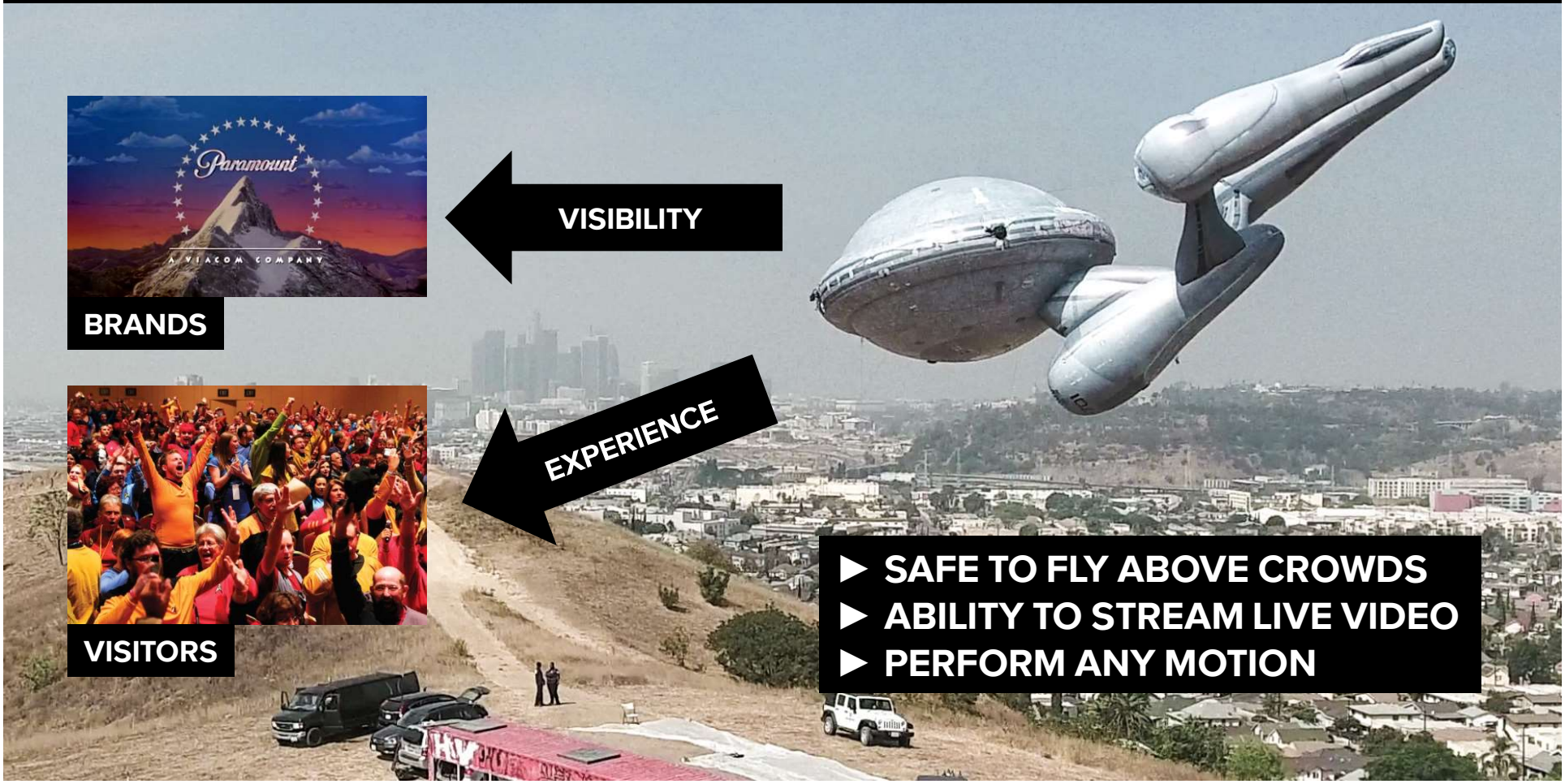

▶ SUCCESS METRICS

AEROTAIN

ATTENTION

EFFECTIVE VISIBILITY FOR BRANDS

RECALL OF OVER 95%

SHAREABLE

SHARABLE EXPERIENCE

UP TO 5x MORE SOCIAL MEDIA POSTS

INTERACTIVE

LIKED BY ALL GENERATIONS

9 OUT OF 10 VISITORS REALLY LIKE THE EXPERIENCE

CUSTOMIZABLE

LONG TERM IMPACT

BRANDED PERSONALIZED PICTURES AS GIVE-AWAY

SAFE

SAFE TO TOUCH IN FLIGHT

CERTIFIED IN CH, USA…, >50 EXECUTED EVENTS

▶ VIDEO

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▶ THRILLED TO ENHANCE LIVE EXPERIENCES

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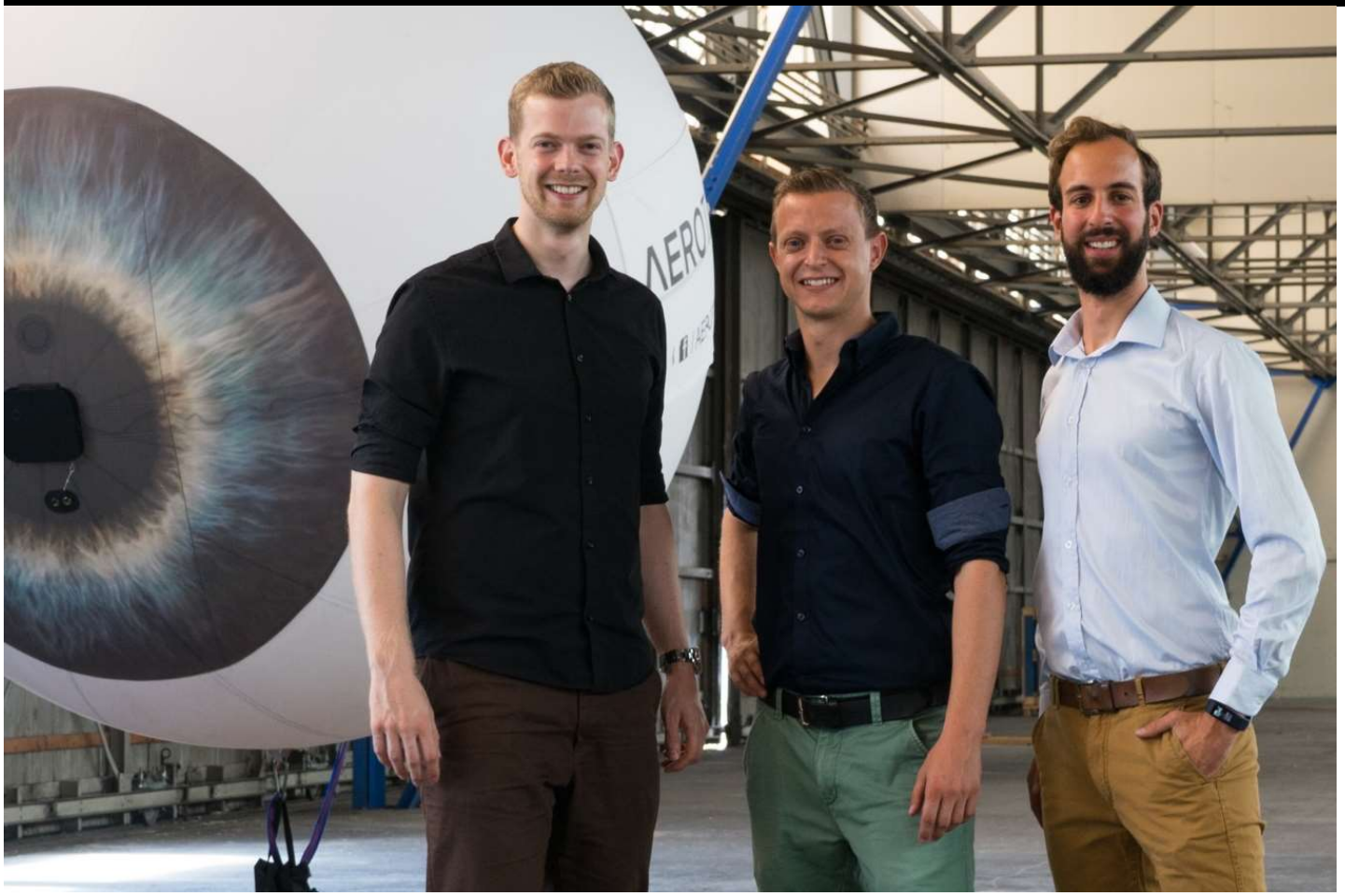


Background:

ETH Zürich

Disney

NASA

▶ AEROTAIN FLIGHT SYSTEM

- Size: ø2.35m
- Weight: 6.5 kg
- Max Speed: 14 km/h
- Max Thrust: 15 N

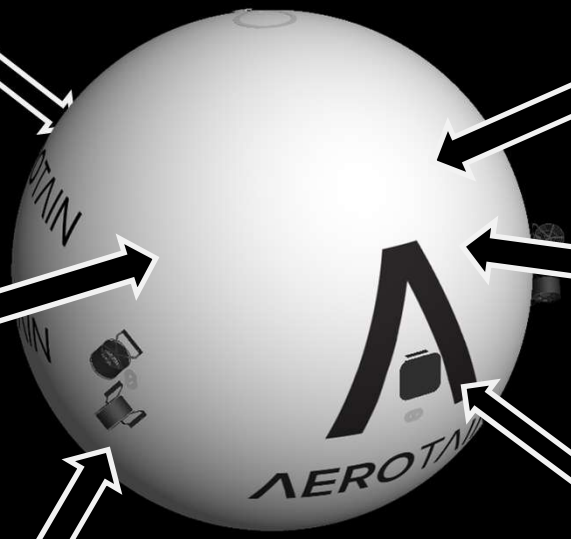
▶ AEROTAIN FLIGHT SYSTEM

COMPUTER & SENSORS

- ▶ State of the art algorithms
- ▶ Stabilize blimp against disturbances
- ▶ Safe descent and fault detection

ENVELOPE

- ▶ Ripstop two-layer material
- ▶ Flame retardant (DIN 4102 B1)
- ▶ 360° high quality printable



HELIUM

- ▶ LTA: Weightless design
- ▶ Non-flameable gas
- ▶ Very low descent energy

LEDS

- ▶ >20W Power
- ▶ Color controllable
- ▶ Magic appearance

6 MOTOR PLATFORMS

- ▶ Redundant motors
- ▶ Spinning parts covered (DIN EN ISO 13857)
- ▶ Emergency shut down

CAMERA

- ▶ GoPro /Sony RX0 Camera
- ▶ 1080p live stream
- ▶ Low latency

AEROTAIN

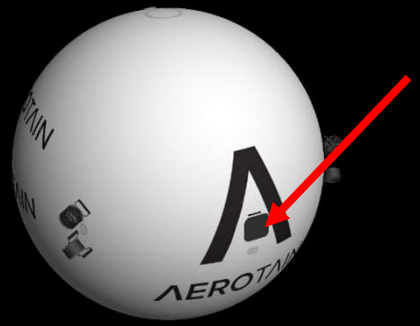
▶ AEROTAIN CONTROL

- FMU
  - Pixhawk
  - px4 stack modified from v1.6.5
- User Input:
  - FRSky Taranis for user input
- Controller:
  - 6DOF independently controllable
  - Attitude controlled
  - Position has to be managed manually

▶ YOUR CHALLENGE

Create an AI application using our blimp as a platform

▶ PAYLOAD

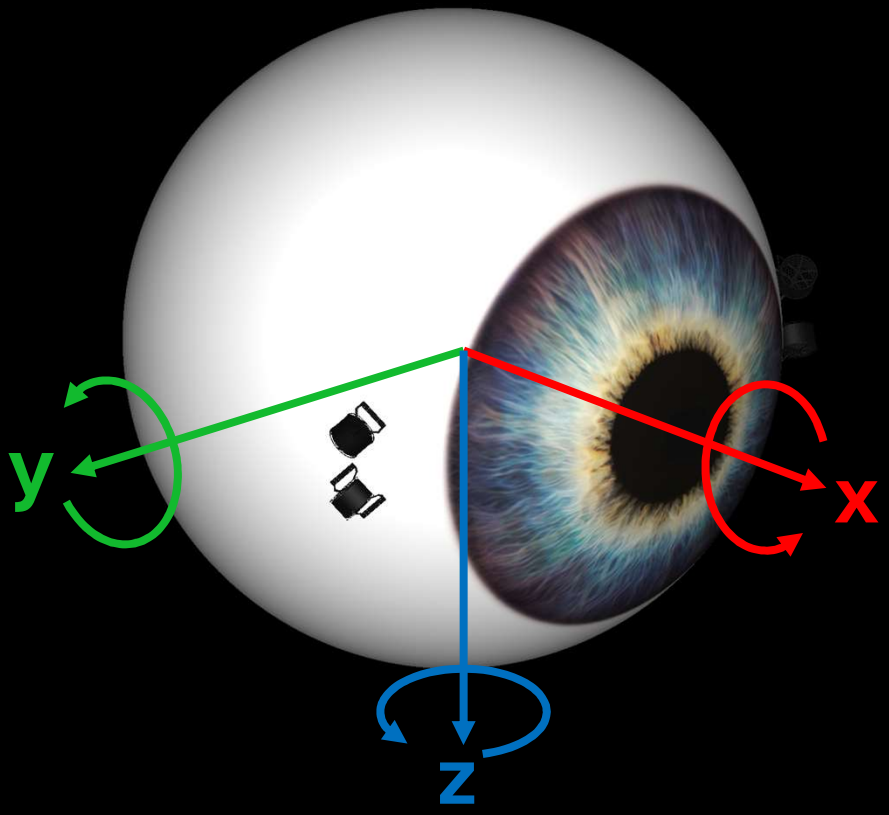


Two Options

- Our Payload:
  - GoPro or Sony RX0
  - 1080p live stream over HDMI
  - Low latency (2ms)

- Your Payload:
  - in the very front of the system
  - Max weight 400gr incl everything (also power supply)

▶ COORDINATE SYSTEM BODY



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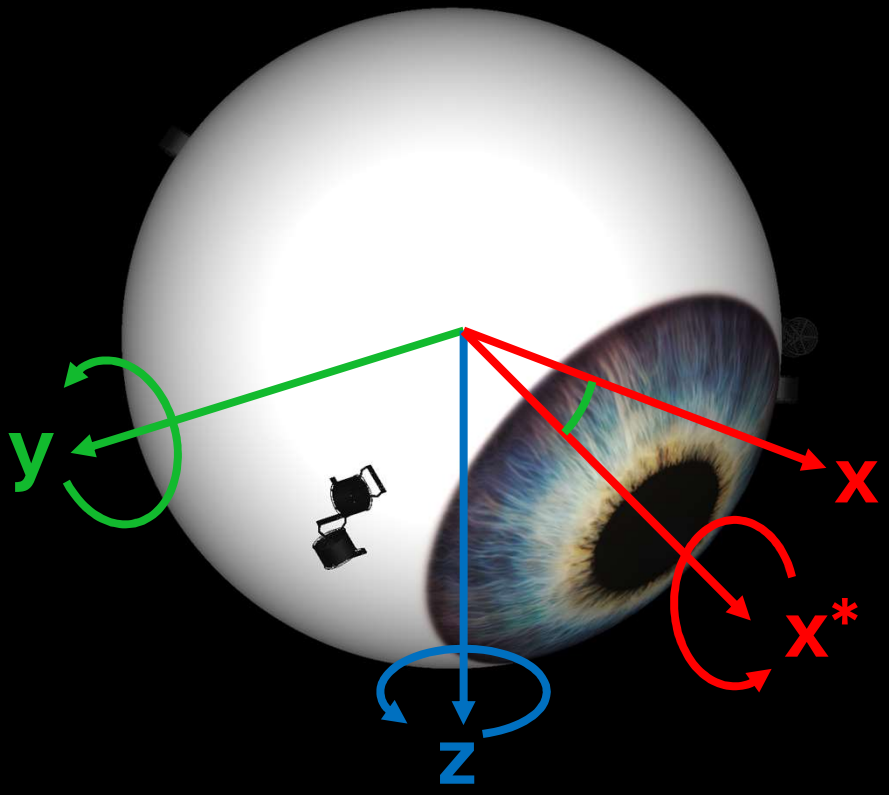
▶ COORDINATE SYSTEM ROTATING



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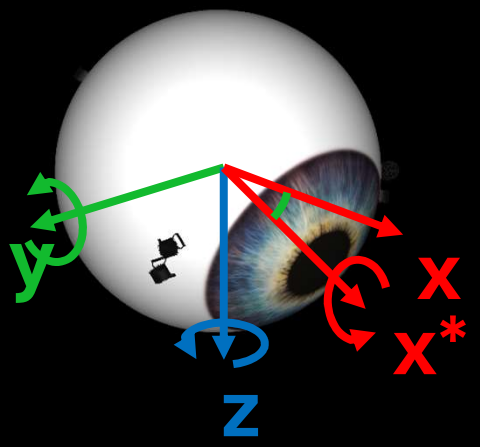
▶ CONTROL MODE



You control:

- Force in translation axis in x,y,z
- Rotation speed yaw (z) and pitch (y)

The roll (x) axis is stabilized to have a level horizon

The forces and rotation speeds are limited

▶ API HARDWARE

Cable interface:

- FTDI Cable with USB for onboard module
- Telemetry Link: for offboard processing

Serial Interface:

- 115200 baud 8N1

▶ API

MAVLink Protocol:

- Standard protocol to communicate with UAVs
- Customizable: Message definition in XML
- Implemented in Java, Python, C++, …

AEROTAIN Telemetry:

- sends all standard px4 telemetry data
- interesting for you:

```
<message id="30" name="ATTITUDE">...
```

▶ CUSTOM MESSAGE

```
<message id="221" name="SETPOINT_6DOF">
    <description>Set the 6 DOF setpoint in terms of force on cog and rotational
speed</description>
    <field type="int16_t" name="trans_x">Translational Component in x</field>
    <field type="int16_t" name="trans_y">Translational Component in y</field>
    <field type="int16_t" name="trans_z">Translational Component in z</field>
    <field type="int16_t" name="rot_x">Rotational Component in x</field>
    <field type="int16_t" name="rot_y">Rotational Component in y</field>
    <field type="int16_t" name="rot_z">Rotational Component in z</field>
    <field type="uint32_t" name="timestamp">Timestamp in ms</field>
  </message>
```

▶ POSSIBLE DEVELOPMENTS

- Basic Challenges:
  - Keep the position
- Navigation:
  - Automatic navigation of a course
- Interaction with people:
  - Detect people and fly to them
  - Follow people
  - React to gestures
  - Fly towards the loudest part of a crowd
  - React to people touching the blimp

- ...

▶ GETTING STARTED WITH MAVLINK

- Install mavlink

https://mavlink.io/en/getting_started/installation.html

- Generate Source Files

https://mavlink.io/en/getting_started/generate_source.html

- With the generator:
  - Choose your custom file, here aerotain.xml
  - Choose output folder
  - Choose e.g. python as language
  - Choose v2.0 as version

- Copy the generated file into your e.g. pymavlink library

- Include aerotain dialect into your python file

▶ USEFUL LINKS

PX4: https://dev.px4.io/en/

MAVLINK:

- **Dev Guide:** https://mavlink.io/en/
- **Github:** https://github.com/mavlink/mavlink
- **Tutorial Basics:** https://diydrones.com/forum/topics/mavlink-tutorial-for-absolute-dummies-part-i?groupUrl=arducopterusergroup&
- **Install mavlink:** https://mavlink.io/en/getting_started/installation.html
- **Generate Source Files:** https://mavlink.io/en/getting_started/generate_source.html
- **Pymavlink:** https://github.com/ArduPilot/pymavlink

QUESTIONS

AEROTAIN®

WE LEVERAGE LIVE EVENTS WITH INTERACTIVE AND ENGAGING FLYING EXPERIENCES