

Paratoi

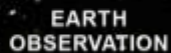
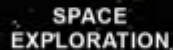
Python-Based Flight Control Procedures for Mission Control Systems





3500 employees

450+ employees



FROM SPACE



THROUGH THE SKIES.



TO EARTH...



Our Portfolio

Key Expertise and Customers

End-to-end Operations of

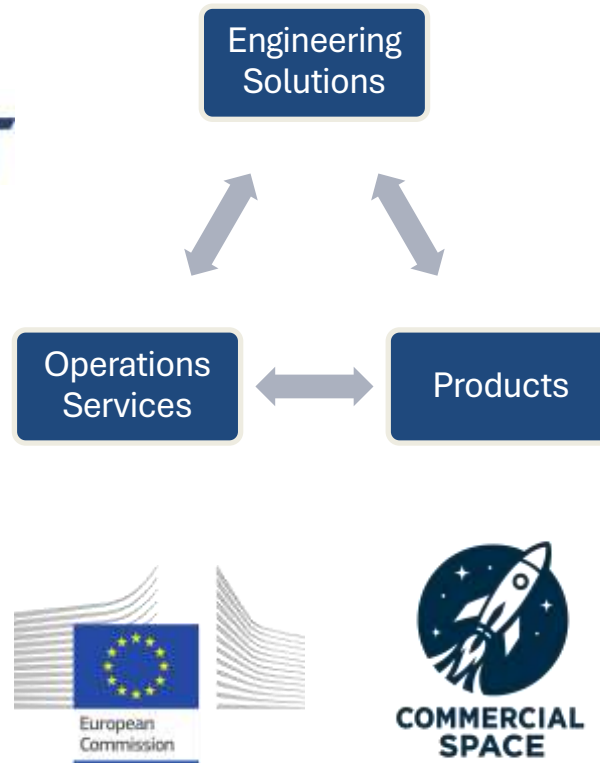
- Spacecraft operations
- Satellite systems
- Infrastructure
- Services (GSaaS, OaaS, ..)

ICT Solutions and Services

- ICT Engineering
- Secure connectivity and integration
- Network security

Space and Aerospace

- Ground segment systems
- Satellite simulation and digital twins
- Satellite communications
- Safety & cybersecurity for space
- Aviation solutions and services



Flight-Control Procedures

- Manual or automated procedures for specific situations
- Different Domain Specific Languages (DSL)
- Users and developers must learn each DSL for every system they are working with

What to do?

A lot of people know Python!

```
activity list CRCS010A

/* Initial Checks */
step

/* mode */
verify get engineering value of AST82350 of ACCS_Software of S6A_spacecraft of S6A = "NOM";

<<< ADSF recommends to disarm the FCV by Ground in this case of non propulsive modes.
This state can occur in case of a reconfiguration of the RCS Board via OBCP while the AOCS is in NOM. >>>

end step;

/* Verify current FCV Status */
step

/* Request HK TM */
initiate and confirm ASC00012 of AOCS_Software of S6A_spacecraft of S6A
with arguments
  ASP00049_0 := 54 /* Structure ID HK */
end with
with directives
  CmdUplinkTime := 0:00:00:00.000,
  CmdExecutionTime := 0:00:00:00.000,
  SubScheduleId := 9,
  Dispatching := "Y"
end with;
```

OPEN-M Procedural Text Editor: Adapted from "Automated Monitoring and Control Test and Operations Procedure Management and Execution: Concepts and Implementation," by S. Steininger et al., 2025, SpaceOps 2025, paper 0358 (https://doi.org/10.82217/spaceops2025_358).



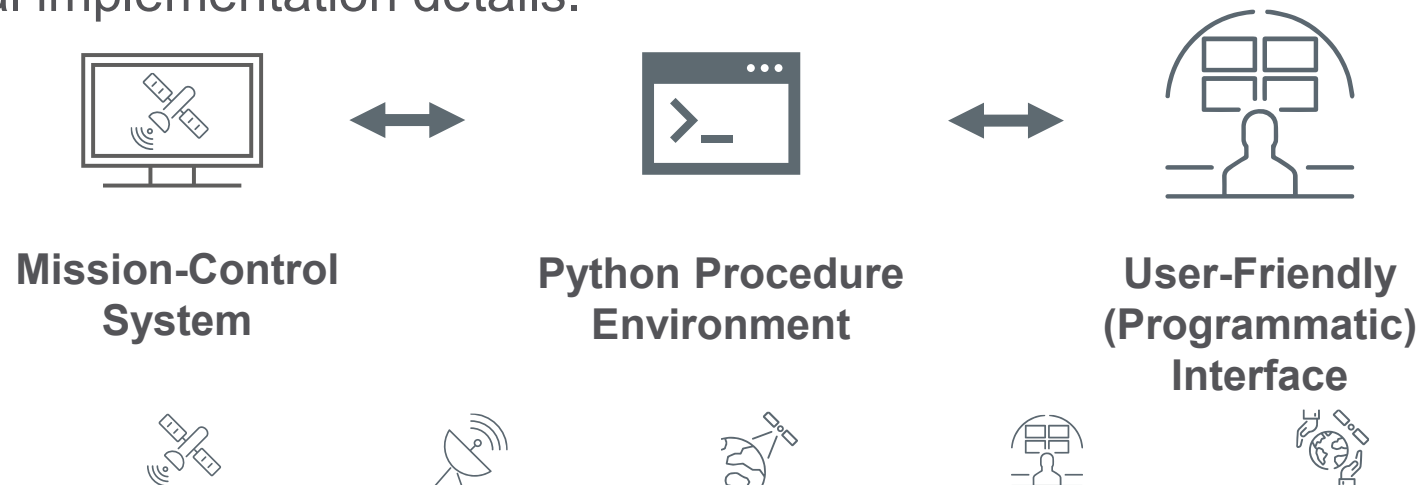
The Project

Problem:

- Domain-specific languages for flight-control procedure have high learning curves
- Different interfaces to different mission-control systems
- Complex technical details for users and developers

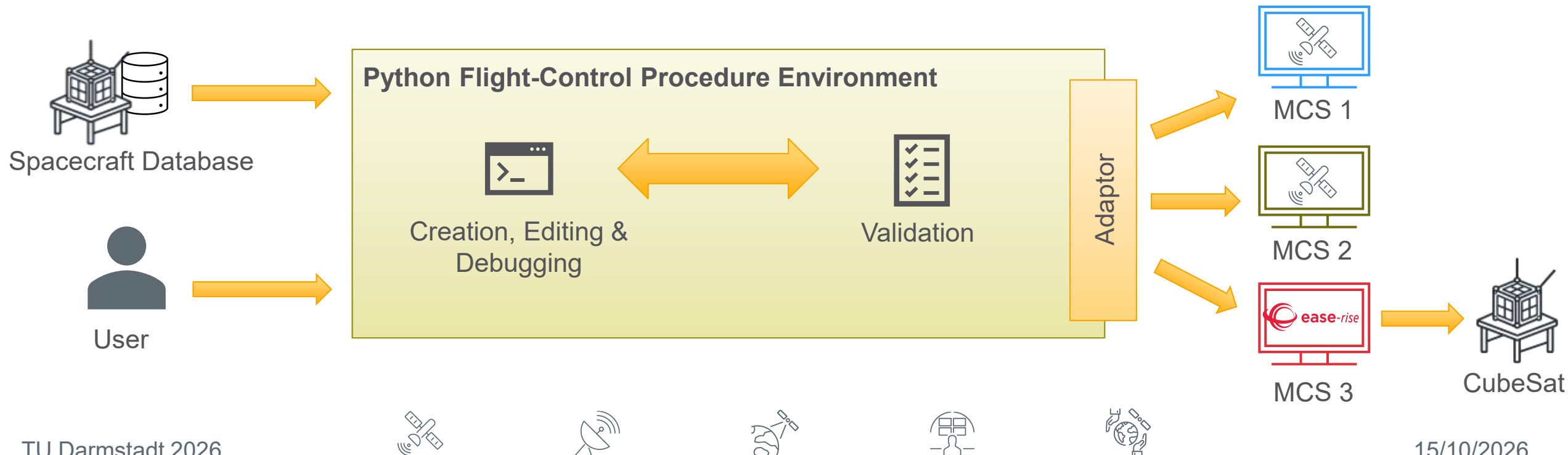
Goal:

- Application to create, validate, manage and submit Python-based flight-control procedure
- Work with spacecraft telecommands, telemetry parameters, and their arguments without needing to know the internal implementation details.



The Project

- Design and implement an environment for developing Python-based flight-control procedures
- Designed to work with different mission control systems through a dedicated adaptor layer
- Adaptor layer implements the scheduling and execution logic for one specific system.



The Project

- **Technologies/Frameworks:** Python, Editor and tooling frameworks, REST API, spacecraft database interfaces, CubeSat
- **Methodology:** Agile (SCRUM), remote work with GitLab and JIRA



Collaboration

- **English** Communication
- Regular touch via email and MS-Teams
- In-person meeting if necessary



THANK YOU
FOR YOUR ATTENTION

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