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Federal Department of the Environment,  
Transport, Energy and Communications DETEC

**Federal Office of Civil Aviation FOCA**  
Strategy and Innovation Unit

# **Automated framework for an evidence- based oversight of U-space service providers**

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# Where should USSPs apply?

*(EU) 2021/664 Article 14: Application for a certificate*

1. ... a certificate issued by the **competent authority of the Member State** of their principal place of business.
2. ... that have their principal place of business, are established, or reside in **a third country**, shall apply for a certificate to the **European Union Aviation Safety Agency** ('the Agency').



## What happens once certified?

*(EU) 2021/664 Article 18: Tasks of the competent authorities*

The designated competent authorities shall:

(d) ensure that **data exchanges** between air traffic service providers and U-space service providers are made in accordance with Annex V;

(h) require the providers of common information and U-space service providers to make available **all necessary information...**

(k) **regularly monitor and assess** the levels of safety performance...



# In practice

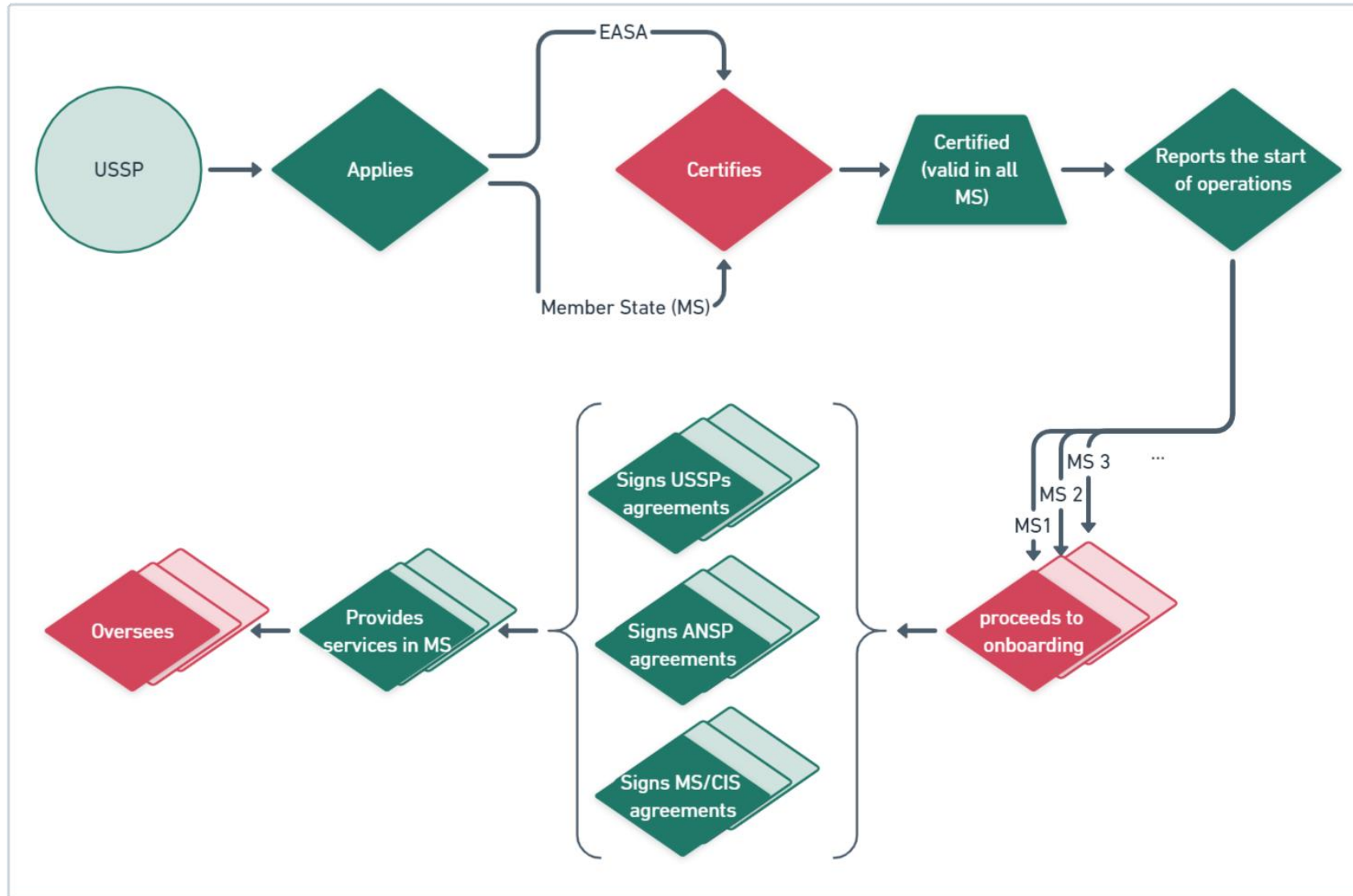
Certification is valid across EASA MS

but

onboarding and oversight practices can lead to fragmentation

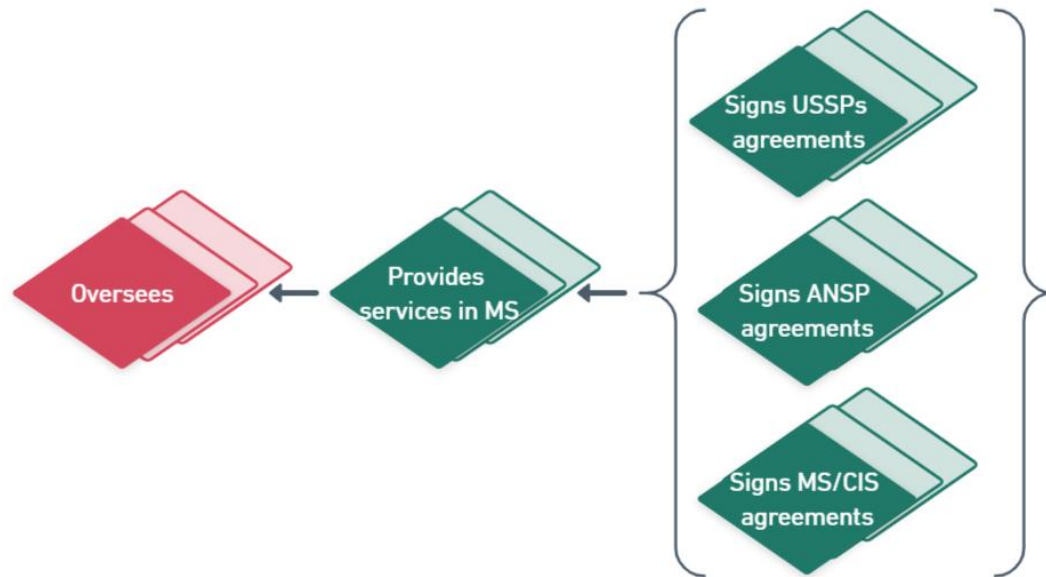


# What it means





# Avoiding Fragmentation

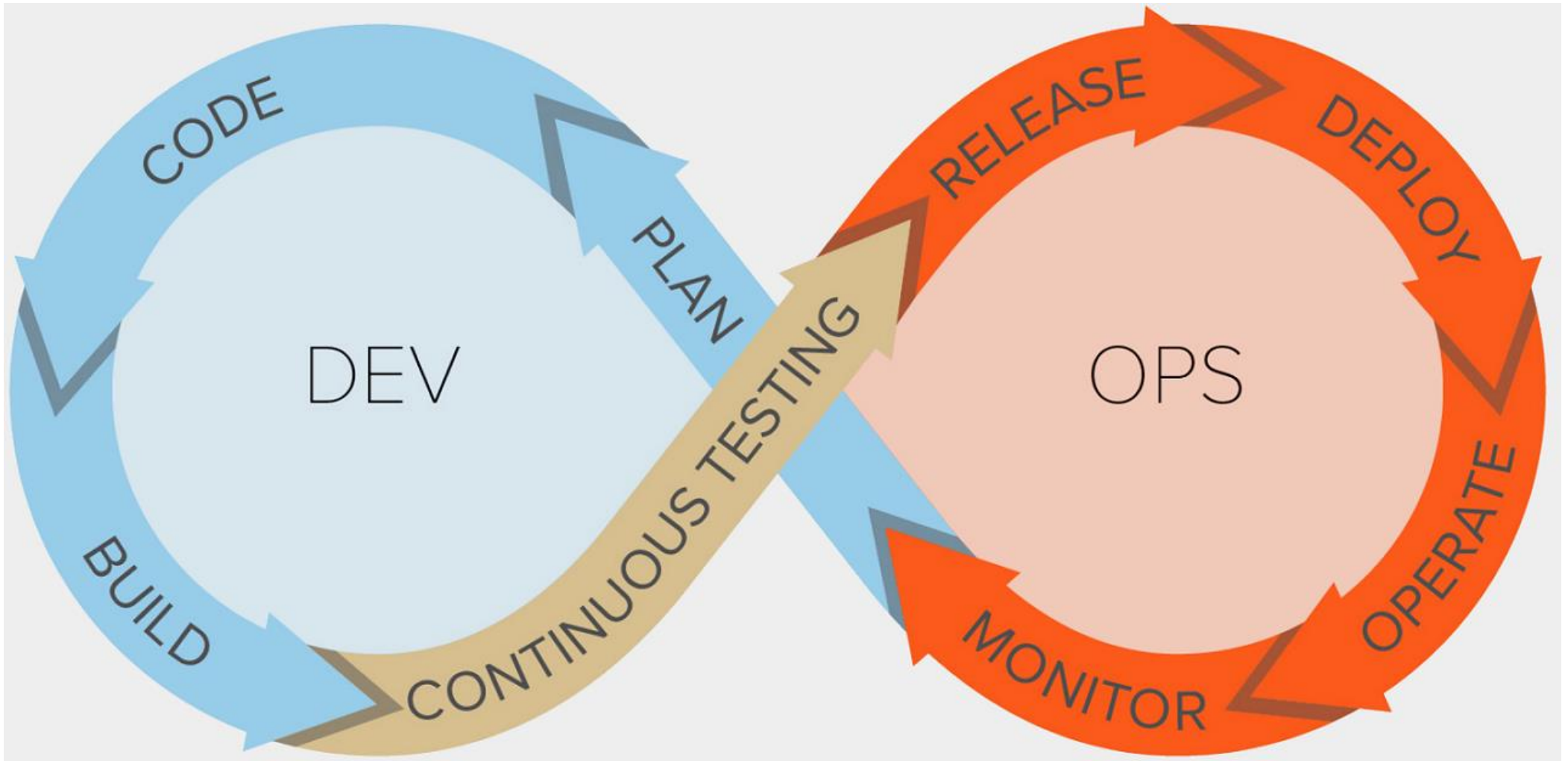


Templates are the way to harmonize legal documents

Testing frameworks are the way to harmonize oversight



# USSPs live in a world of constant changes





# Oversight has to be largely automated

Manual processes are poorly suited to the oversight of digital services

- They make it hard to find the cause of an issue
- They do not scale up (staff and expenses)
- They can only be performed on an intermittent basis
- Changes to the system are hard to coordinate (i.e upgrades, new standards, ...)

The solution is continuous monitoring, defined as a process to automatically monitor and identify compliance issues and security risks in IT operations.





# An example: The oversight of Network Remote ID

We use an automated solution with three basic steps (simplified)

1. An API generates flight paths and patterns within a specified bounding box.
2. A USSP simulates flights using the data generated in step 1.
3. A tool queries the USSP and evaluates the results against the known data.

The source code is available as open source under the InterUSS platform (Linux foundation): [https://github.com/interuss/dss/tree/master/monitoring/rid\\_qualifier](https://github.com/interuss/dss/tree/master/monitoring/rid_qualifier)

The platform also provides an implementation of a Discovery and Synchronization service but the test would work with other implementations too.

Everything is based on the ASTM F3411-19 standard and is compatible with the U-space regulatory package



# Benefits for the USSPs

USSPs benefit from an automated testing framework:

- Ability to test their code base against other participants in the network at all time, without requiring further coordination
- It is integrated in the kind of process they know (vs traditional oversight), for instance in how they move from the staging environment to production.
- It removes issues about upgrades to the system (a test environment can be used to test everyone before upgrading to a new standard version for instance)
- It can be harmonized internationally



# Benefits for the authorities

Authorities also benefit from an automated testing framework:

- When the authorities trust the framework, they can simply ask USSPs to log the results of their tests, which must be available on demand. This is in line with the spirit of the regulation: data exchange is under the responsibility of USSPs.
- The frequency of tests can be set at any desired time interval
- The tool is harmonized internationally: any improvement to the testing framework can immediately get used by all MS.
- The framework can get adapted as needed by forking it.



# Status in Switzerland

- The test framework for Network Remote Identification has been successfully deployed by a first company.
- A first test framework for Flight Authorization is about to be finalized.
- Geo-awareness will follow and Traffic Information will come last.



# Open Source Governance



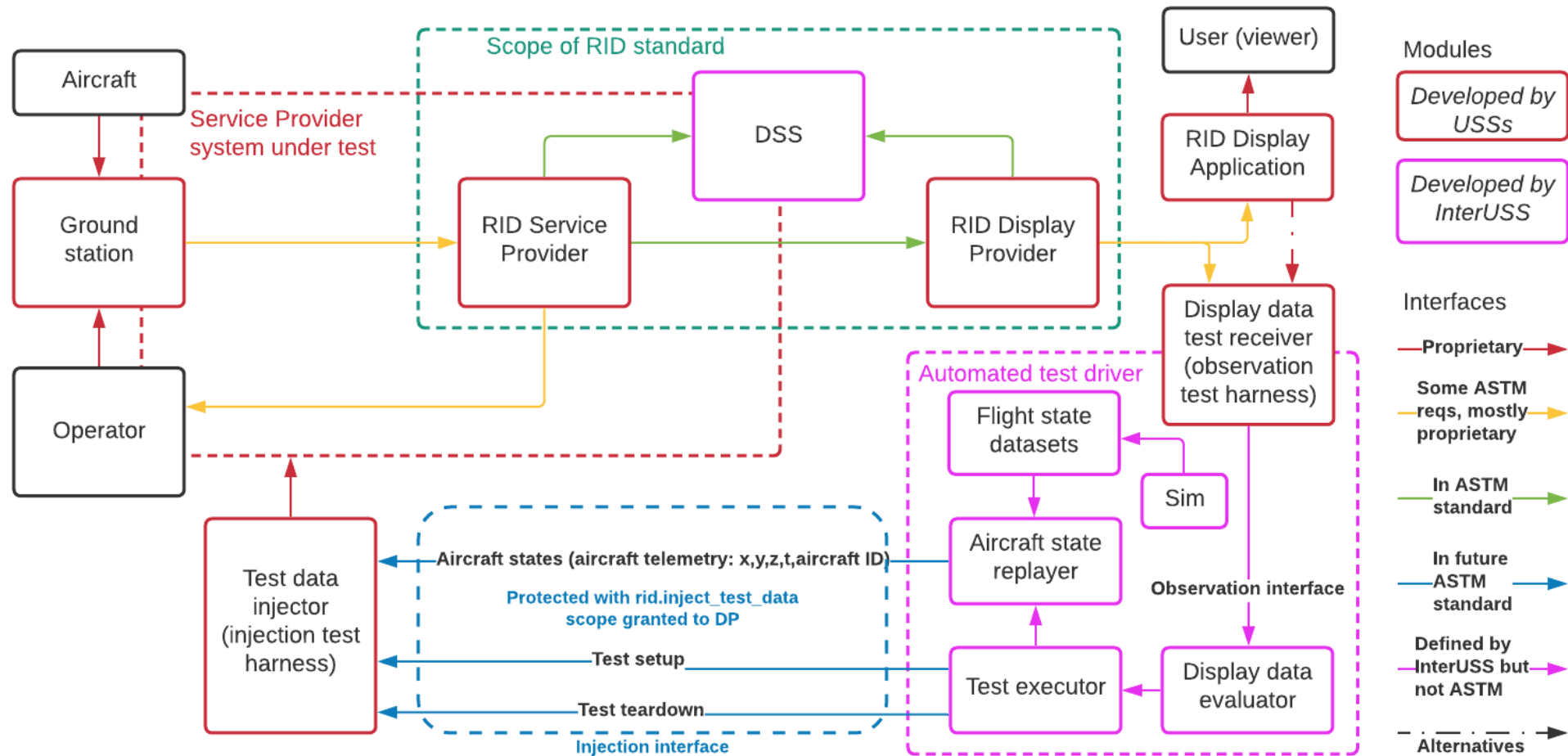
- [Linux Foundation \(Linuxfoundation.org\)](https://www.linuxfoundation.org)
- [InterUSS \(interussplatform.org\)](https://interussplatform.org)
- [github.com/interuss/dss/tree/master/monitoring](https://github.com/interuss/dss/tree/master/monitoring)



# Thank you!



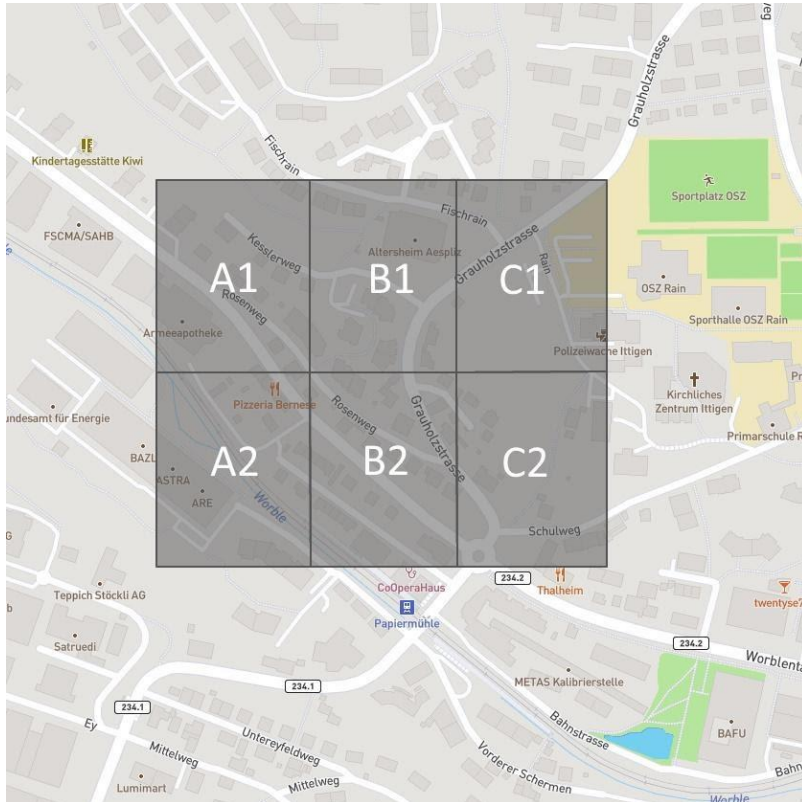
# It's easy but not trivial



Source : <https://github.com/interuss/dss/tree/master/interfaces/automated-testing/rid>



# Manual testing: How it looked



- Every Service Provider (SP) had to simulate two flights, taking off at the same time.
- The flights had to be in the air for 30 minutes, unless flights were asked to land as a part of the trial
- The flights had to be moving and stay in the grid cell allocated to them





# Manual testing: Trying to debug

Step (T)	Details	Entity	Query Endpoint	(Pass criteria) Expected Response from DP
1	All SP inject simultaneously 2 simulated flights in the service area (randomly within ~ 1km area based on Boundaries link above) for 60 minutes	SP	Each SP confirms that their flights are in air	Flights up confirmed
2a	When called, in the order of the table below, Test Driver opens up Ittigen Area in application (~ 1km area based on Boundaries link above)	Test Driver (Display Application)	Application and area confirmed by TD	
2b	Query for flights in the specified area	Test Driver (Display Application)	Query confirmed by TD	
3	Test Driver Displays Remote ID information from SP	Test Driver (Display Application)	Flights can be seen by DPs	See table

Company 1	Company 2	Company 3	Company 4	Company 5	...
OK	Token issue	Incorrect format JSON	OK	Cannot see Company 1 flights	



# Automated testing

Service Provider Details		Observer Details	
Name	uss1	Name	flight_blender
URL	http://localhost:8071/injection/	URL	http://local.test:8000/dss/
DSS Audience	localhost	DSS Audience	localtest

Evaluation Criteria		Test Details	
Min. Query Diagonal (meters)	100	Start	2021-05-11 13:23:58
Propogation Latency (seconds)	0:00:10	End	2021-05-11 13:43:50
Polling Interval (seconds)	0:00:05	Locale	che

## Observed Issues

The list below shows observed issues during the test. Even if there are issues, it may mean that the system is working as designed, it is recommended that an expert review and assess the performance.

#	Response Code	Severity	Error Code	Flight ID	Summary
1	200	Critical	MISSING_FLIGHT	0	Expected flight not found
2	200	Critical	MISSING_FLIGHT	0	Expected flight not found