DOMINO-E COVERAGE SERVICE

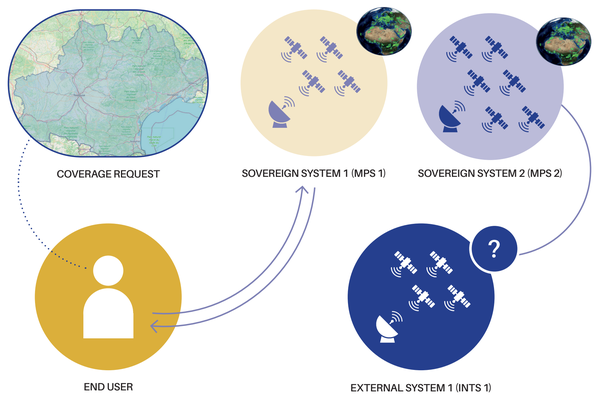
A Flexible, Smart Automated, Tool for Multi-Mission Federation

DOMINO

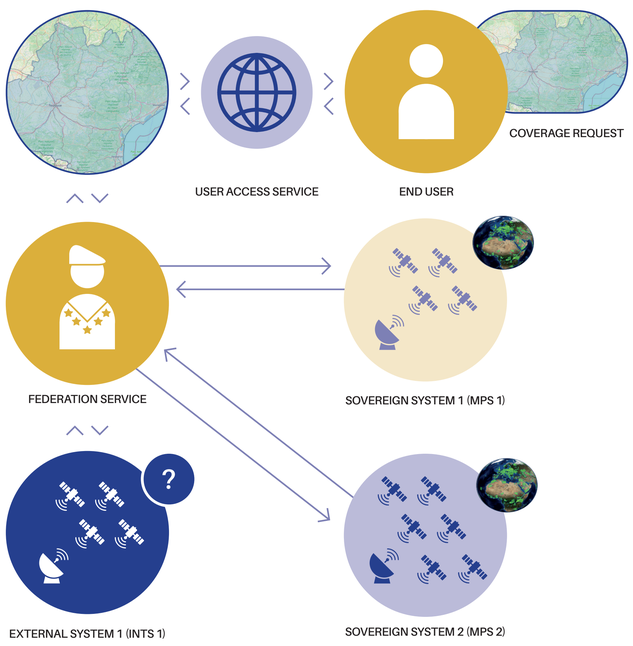
NEED FOR ADAPTION

Need to adapt existing multi-mission solution to better manage coverage requests

Current Solution



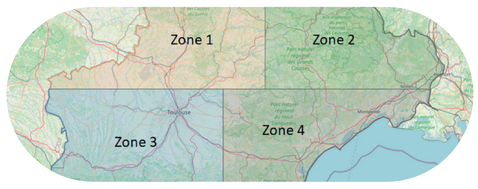
Introducing Coverage Service (Federation Service)



COVERAGE SERVICE DOMINO PROVIDES SERVICES TO THE UAS USING FEDERATED SYSTEMS IN AN OPTIMAL WAY.

CONSERVATIVE STRATEGY

Choice at subarea scale



DIVIDE REQUEST INTO MONO-MISSION SUBREQUESTS:

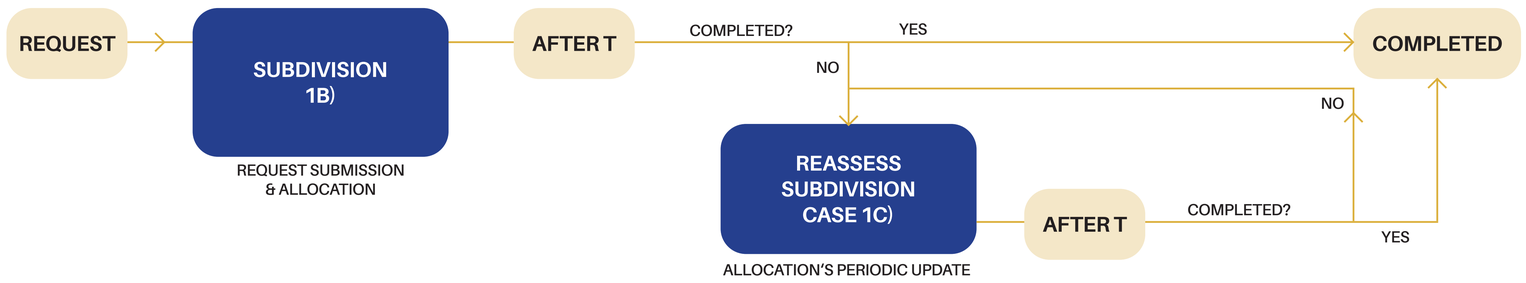
- Manually, (case 1a)
- Automatically (case 1b)
- Periodically reassessed (case 1c)

CHALLENGES:

- Uncertainties management (weather, new request) → dealt with reassessment

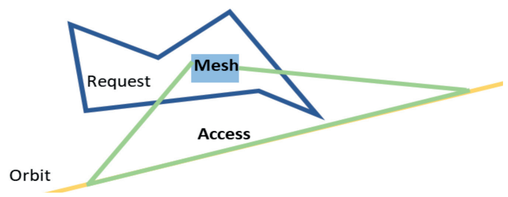
COARSE DISPATCH → LONG-TERM, COVERAGE SUBREQUEST.

Chronology of execution of use cases 1



DISRUPTIVE STRATEGY

Choice at the mesh scale



MESH:
Unitary area that can be pictured by a satellite at once

ACCESS:
Period of time where satellite can acquire a mesh

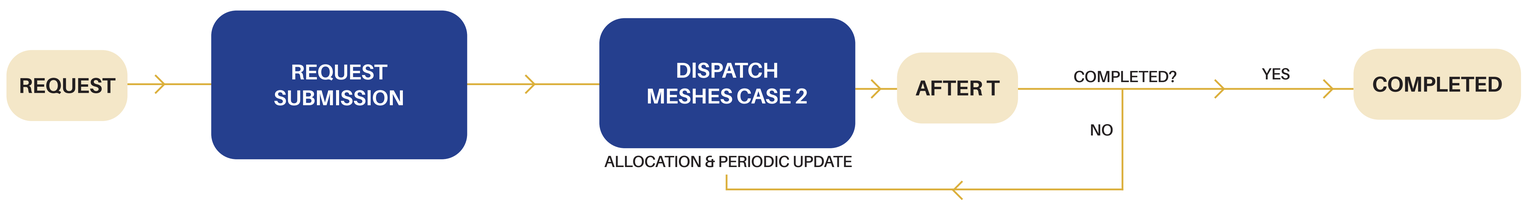
CHALLENGES:

- Algorithm complexity → Time of execution
- Combination of unitary pictures into one large area mosaic

SELECT MESHES AND ACCESS DIRECTLY

DETAILED DISPATCH → CONSTRAINED, SHORT-TERM SUBREQUEST (MESH)

Chronology of execution of use cases 2



COVERAGE REQUEST

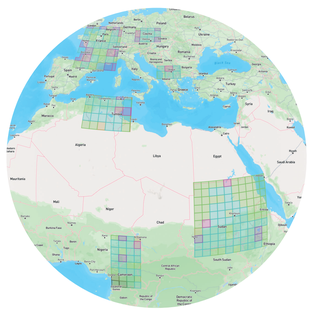
REQUEST:

- Geographic area to picture
- Period of validity
- Priority level
- Constellations that can acquire the request
- Cloud coverage constraints

MULTI-MISSION REQUEST:
Several constellation possible

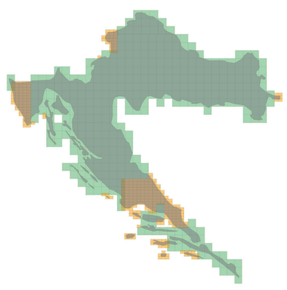
COVERAGE REQUEST:
Not feasible in one satellite pass

FIRST RESULTS



RESULTS OF FIRST STRATEGY DISPATCH EXECUTED WITH:

- Several coverage request
- Orderbook localized in Europe and northern Africa
- 8 EO constellations with different acquiring capacity



RESULTS OF MESHES SCALED DISPATCH EXECUTED WITH:

- Croatia as coverage request
- 2 EO constellations with different acquiring capacity

RESULTS OBTAINED SHOW BOTH STRATEGIES ARE USING EVERY SYSTEM AND TEND TOWARD GROUPING REQUEST ASSIGNED TO THE SAME EO CONSTELLATION.

CONCLUSION

AN ADAPTATION OF THE MULTI MISSION HAS BEEN PROPOSED WITH TWO DIFFERENT STRATEGIES:

- A conservative one that can be injected rapidly
- A more disruptive one, for a more long term adaptation.
- First results are encouraging. A more optimal solution could be considered in the future, depending on the execution of time constraints.

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