

LOFT ORBITAL

# FUTURE-PROOF MISSION CONTROL SYSTEMS

LEVERAGING AGNOSTIC DESIGN FOR AUTONOMOUS  
AND EVENT-DRIVEN SATELLITE OPERATIONS

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# WHAT ARE WE DOING, AGAIN?

Loft is building a **space infrastructure** to enable its customers to fly and operate any mission faster, simpler and safer.



**UNIVERSAL**

*Any payload: physical or software-defined.*

*Support from one-off to mega-constellations.*



**FAST**

*Accelerate schedule from design to orbit.*

*Integrate within days, not months.*



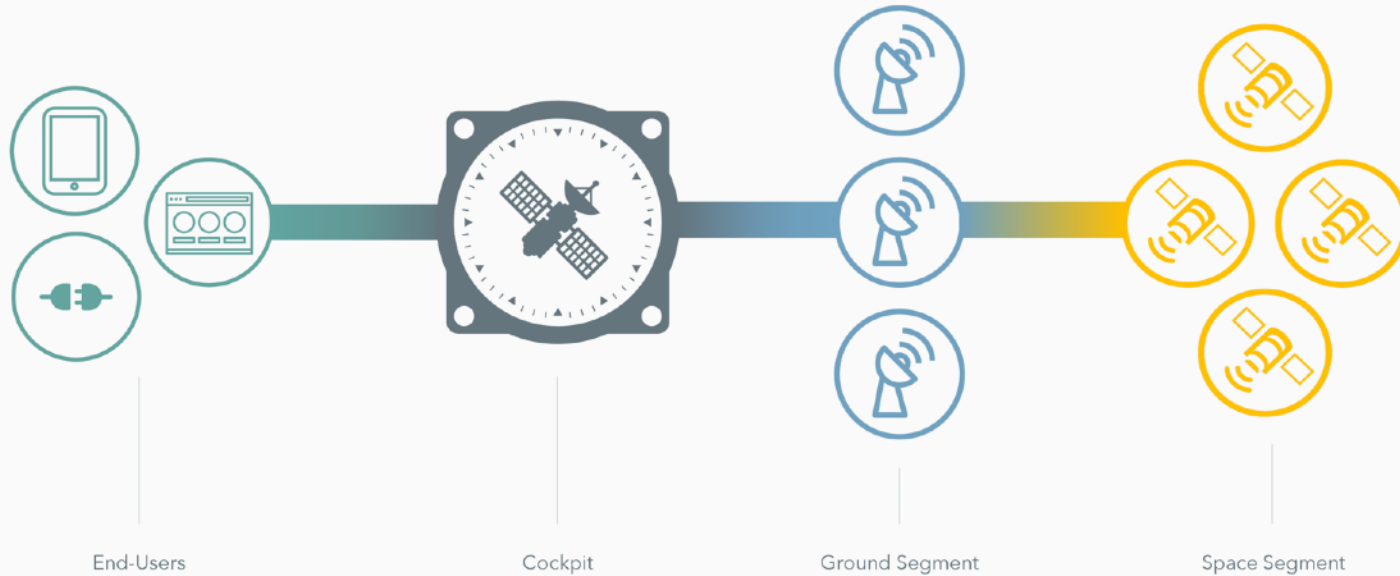
**SIMPLE**

*No specific knowledge required to operate mission.*

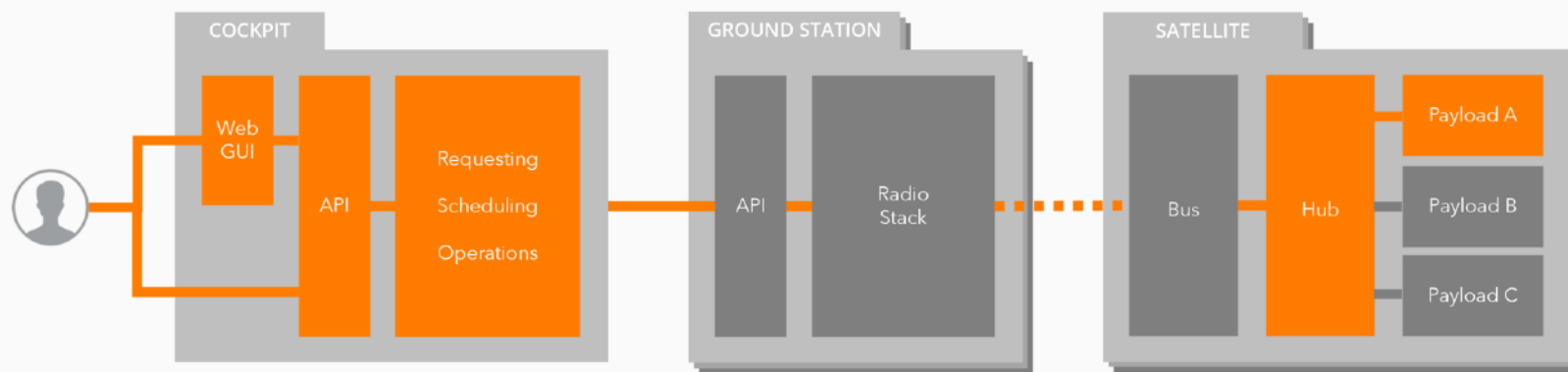
*Full automation focusing on scalability and performance.*

# THE BIG PICTURE

Cockpit empowers end-users with powerful satellite constellation management capabilities while **abstracting away** the complexity of spacecraft operations.

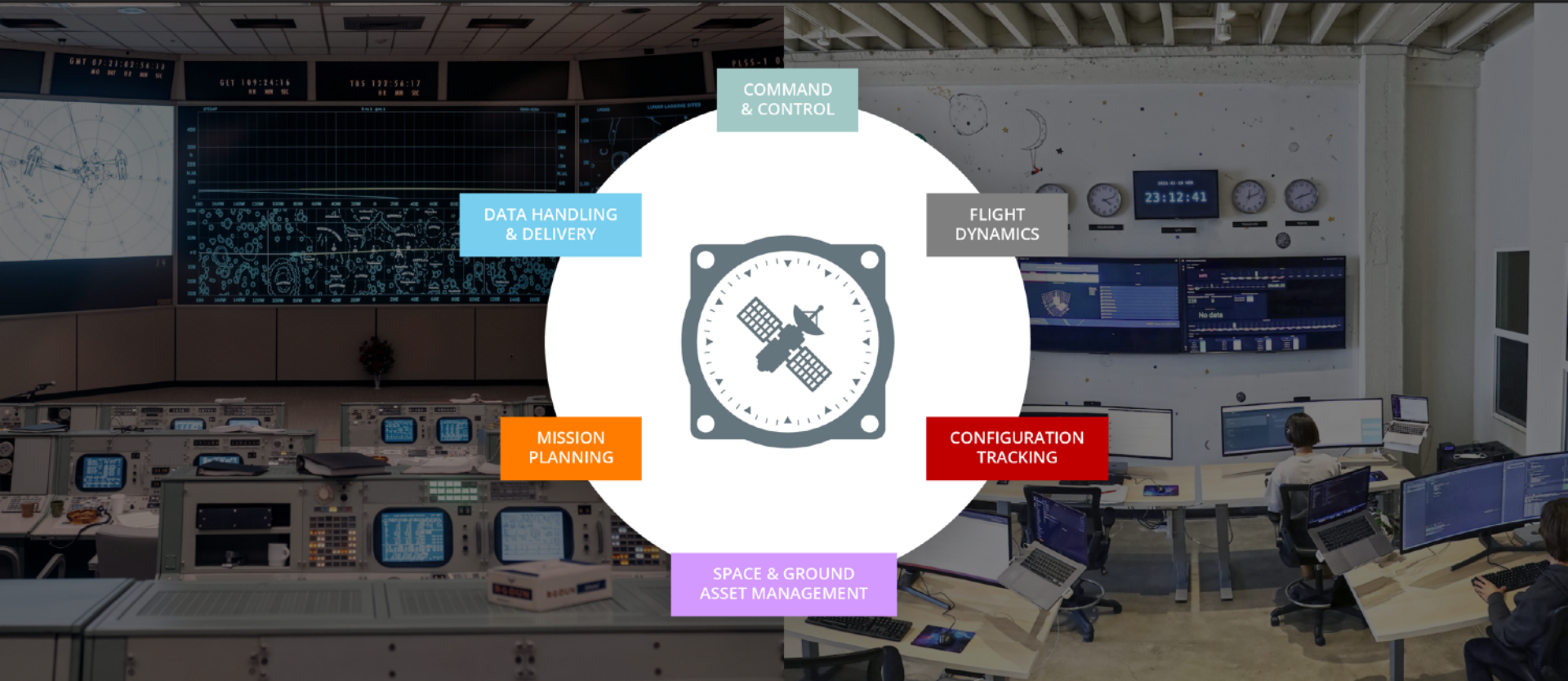


# TYPICAL CONTROL & DATA FLOW



Loft Providers

# GROUND CONTROL INTEGRATED & AUTOMATED



COMMAND  
& CONTROL

DATA HANDLING  
& DELIVERY

FLIGHT  
DYNAMICS



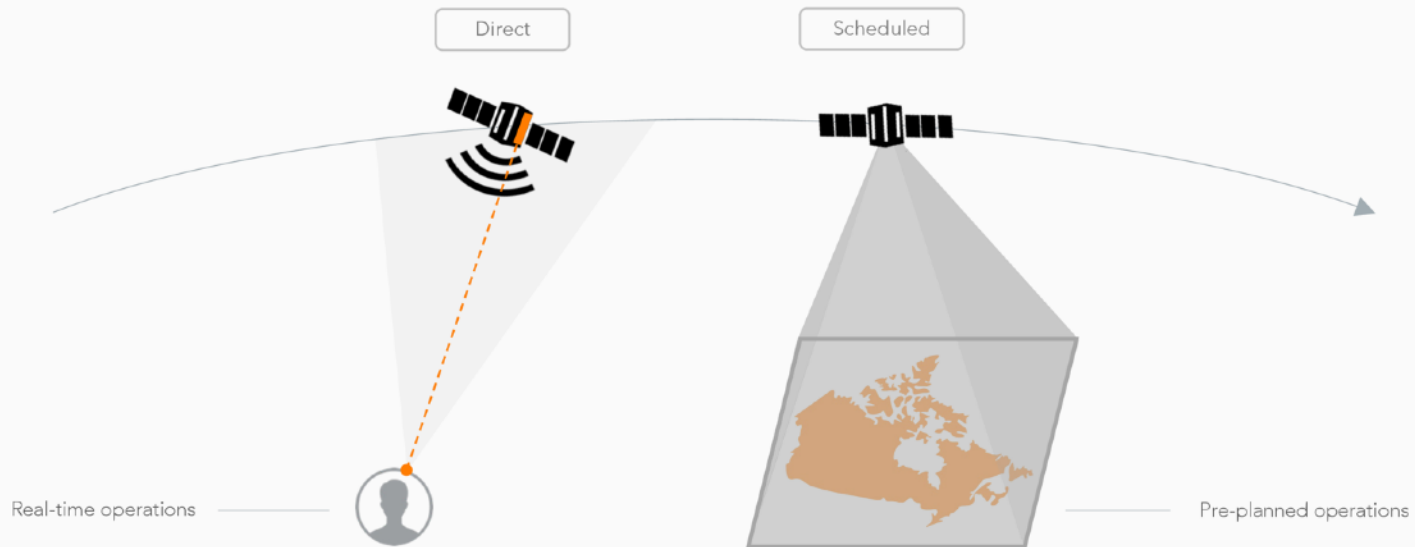
MISSION  
PLANNING

CONFIGURATION  
TRACKING

SPACE & GROUND  
ASSET MANAGEMENT

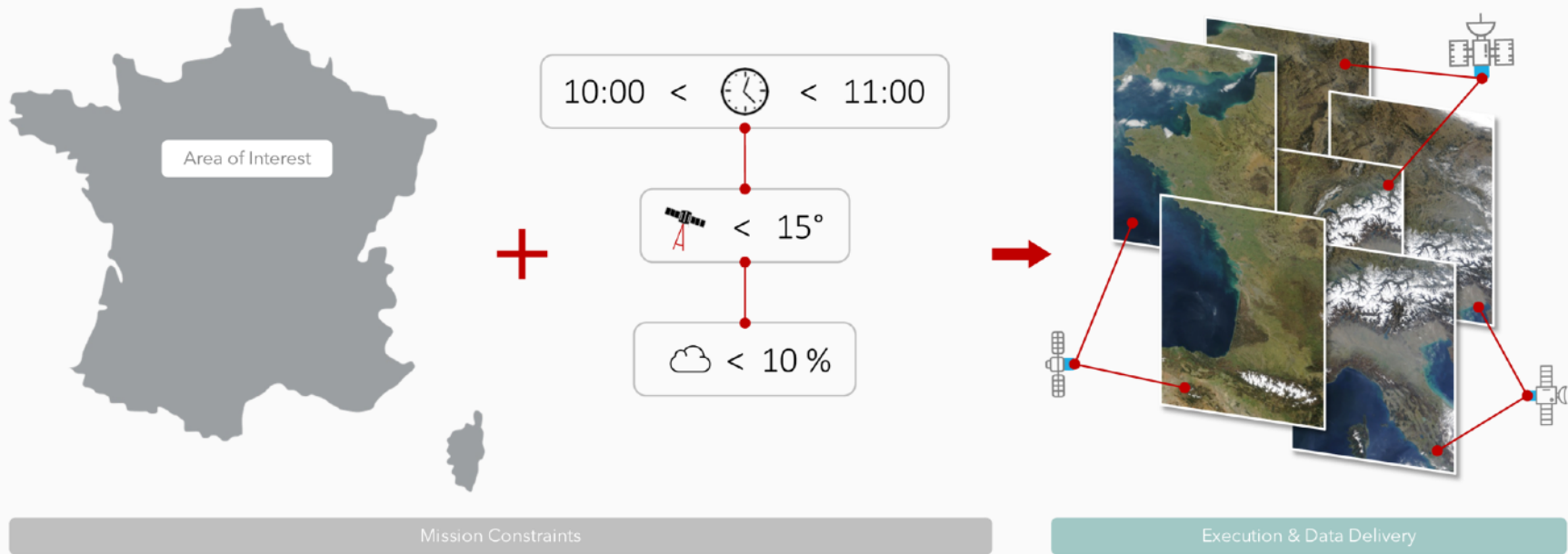
# OPERATIONAL CONCEPTS

Direct and scheduled mission control capabilities are provided.  
Even on a **rideshare configuration**, payloads can be operated as if they were flying on a dedicated satellite.



# TYPICAL REQUESTING FLOW

Using constrained mission scheduling, **optimal scenarios** are automatically generated from execution to data delivery.



# REQUESTING FORMALISM

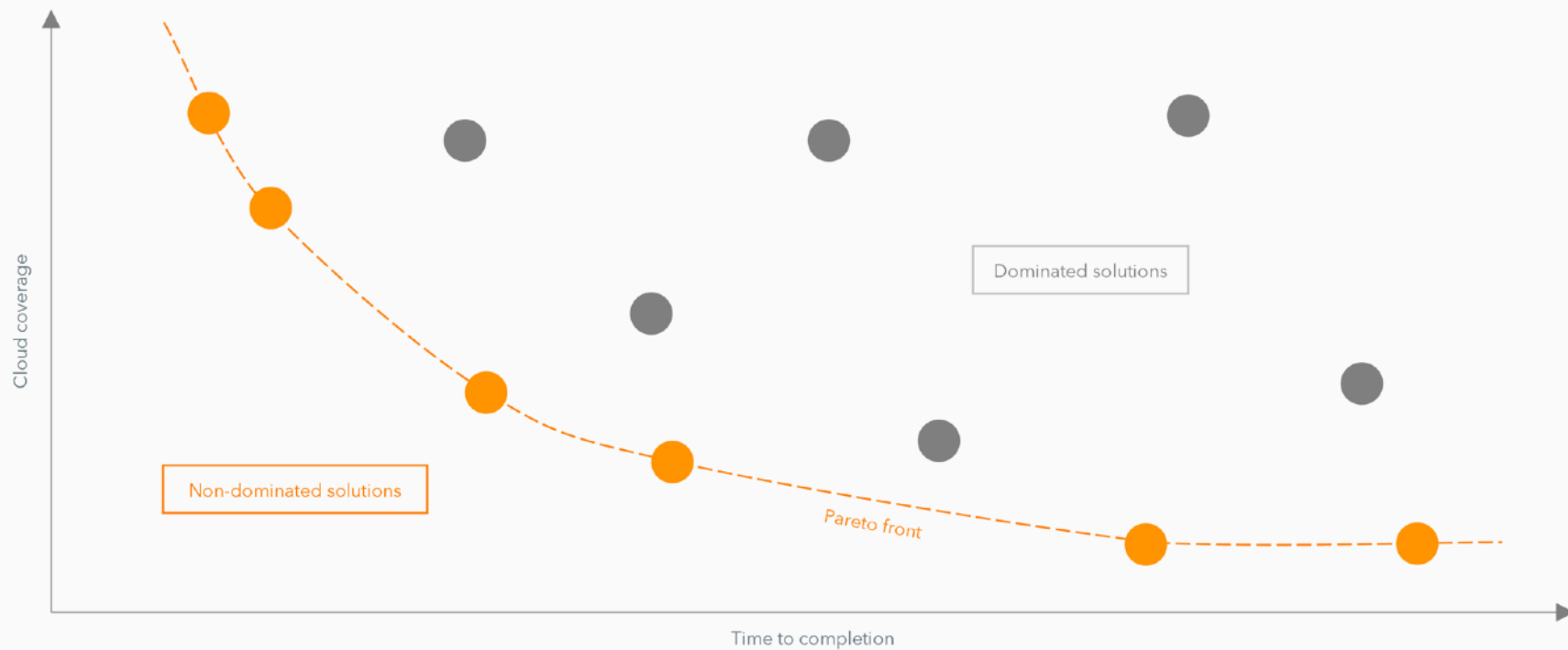
Mission-agnostic set to gather execution **requirements**.




Set of potential execution **plans**, each compatible with the requirements.



# REQUESTING TRADE-OFFS



# REQUESTING METRICS



Request ▶ 3b23e0cf

Refresh Edit

Accepted Confirmed Scheduled Completed

Fragment f4828d45-fe38-4ebc-81ec-571221c9c19b

Start 2022-09-13 10:32:50.422 UTC  
 End 2022-09-13 10:49:05.322 UTC  
 Duration 00:16:15  
 Time to completion -


Satellite Trajectory Profile

Summary Latitude Longitude Altitude Data

Mean latitude 25.3878 °    Mean longitude 56.5590 °    Mean altitude 518.42 km

Satellite Attitude Profile

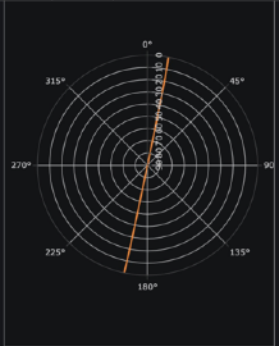
Summary Quaternion B ▶ ECI Data



Status Delivery Info

Request ▶ 3b23e0cf

Refresh Edit



Timeline

SMS Manual Sequence PDP Q Sim C R

ORCI PDP Q Sim C R

PCDU

PCP PE PDP Q Sim C R PDP D

Simara Sim C T

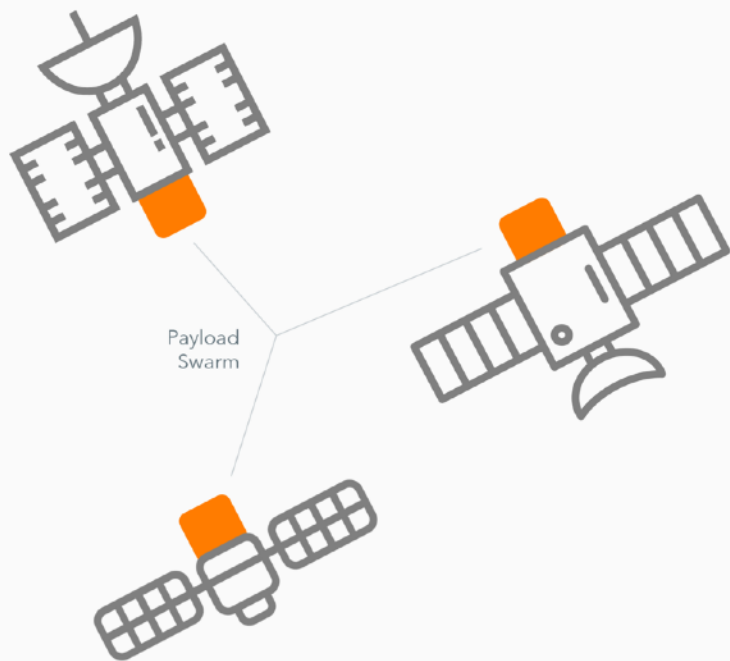
PIC PDP D

10:35 10:40 10:45

Status Delivery Info

2022-09-13 11:02:48 UTC
Now-1h - Now+2h

# PAYLOAD SWARMS

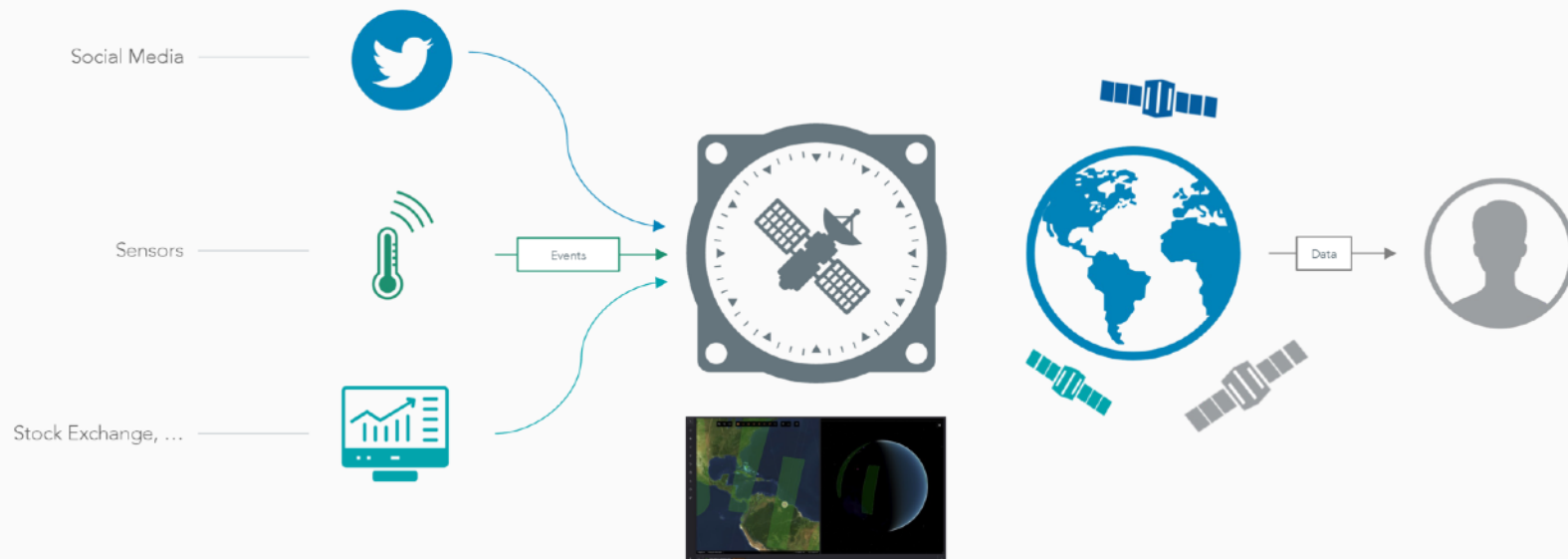


Payloads distributed across multiple spacecraft can be controlled **as a single integrated system.**

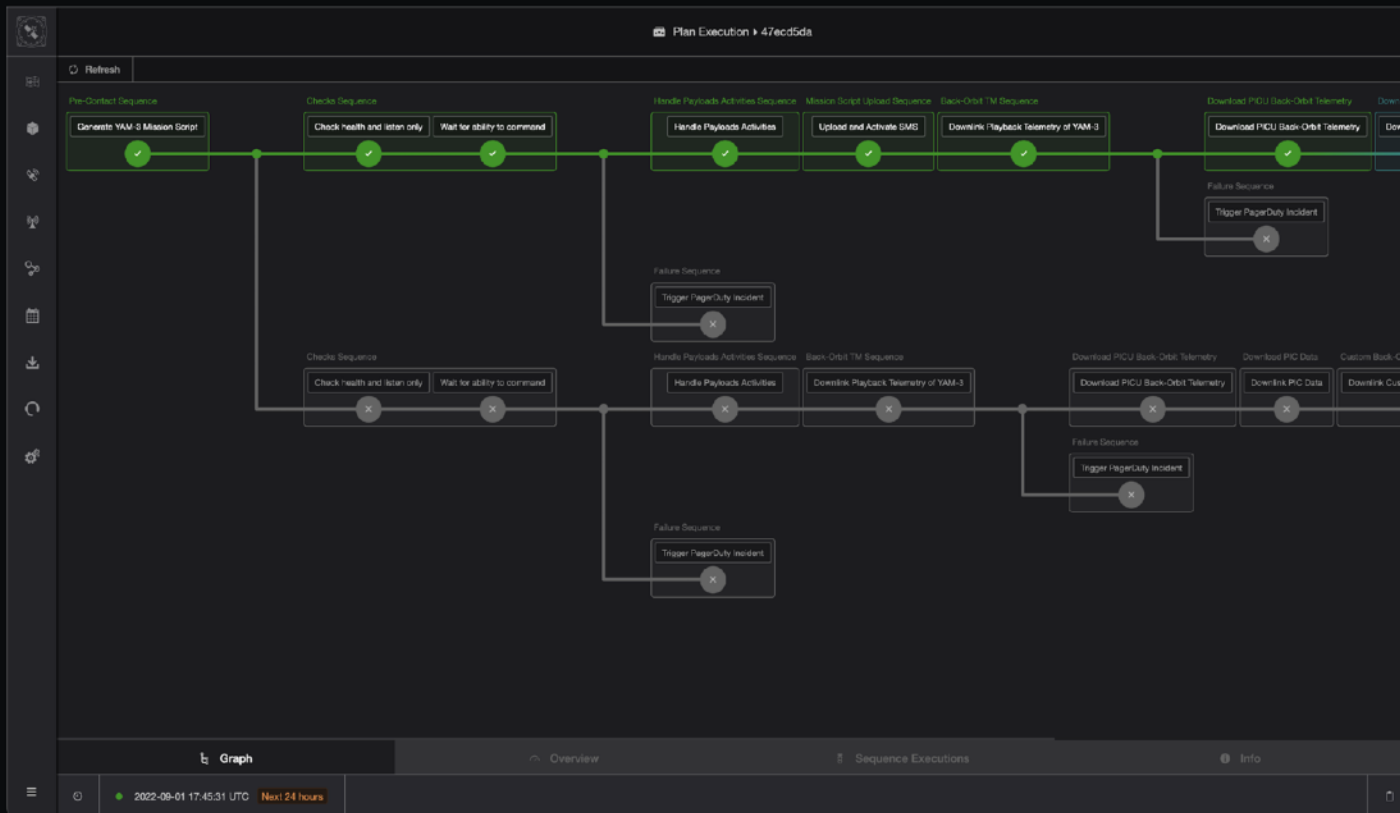
Cockpit automatically dispatches work, optimally leveraging available assets.

# EVENT-DRIVEN FLOW

Users can define **event-driven pipelines** to further automate their mission execution.



# AUTO-PILOT ENGINE



# AUTOMATIC DATA PROCESSING & DELIVERY

The screenshot displays a mission control interface with a dark theme. It is divided into several panels:

- Deliveries Panel:** A table listing completed deliveries.
 

Short #	Created on	Status	Duration
fb943b2b	Sep 11, 13:17	Complete	00:00:07
d1a87d9d	Sep 11, 23:55	Complete	00:00:02
09e63516	Sep 12, 23:35	Complete	00:00:02
- Delivery Detail Panel (09e63516):** Shows details for a specific delivery.
 

Short #	Created on	Status	Duration
7b4488f8	Sep 12, 23:35	Complete	00:00:01
7544df88	Sep 12, 23:35	Complete	00:00:01
- File Transfer Detail Panel (7b4488f8):** Shows metadata for a file transfer.
 

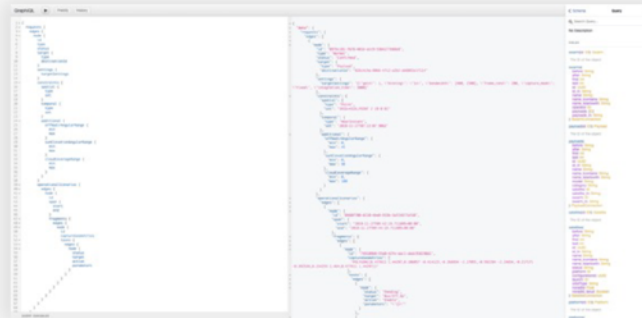
<b>Identifier</b>	7b4488f8-2569-46da-b9
<b>Created on</b>	2022-09-12 23:35:52 UTC
<b>File</b>	..._t.gz
<b>Destination</b>	19350d75-6959-4970-b6a
<b>Status</b>	Complete
<b>Duration</b>	00:00:0
<b>States</b>	2022-09-12 23:35:52.426 UTC Pending 2022-09-12 23:35:52.441 UTC Active 2022-09-12 23:35:53.423 UTC Complete
- Packages Panel:** Lists artifacts for a request.
 

Name	Created on	Size
..._t.gz	Sep 12, 23:35	80.6 KiB
..._t.gz	Sep 12, 23:35	13.4 KiB
- File Detail Panel (398f59dd-73a7-41de-b6cb-0f89f70b7381):** Shows detailed metadata for a file.
 

<b>Identifier</b>	398f59dd-73a7-41de-b6cb-0f89f70b7381
<b>Name</b>	..._t.gz
<b>Description</b>	Output file generated by analysis fc33163f-b64a-49e0-8308-83bb0ce01fat
<b>Created on</b>	2022-09-12 23:35:48.175 UTC
<b>Size</b>	80.6 KiB
<b>Signature</b>	p8E87kLdDhwqc5aRnY31aQ==
<b>Metadata</b>	-
<b>File Transfer</b>	7b4488f8
<b>Packages</b>	-
<b>Locations</b>	-
- System Status:** A bottom bar shows the current time as 2022-09-13 11:15:20 UTC and a 'Last 48 hours' filter.

# INTERFACES

Leveraging the latest **web technologies**,  
Cockpit exposes interfaces for interactive and programmatic access.

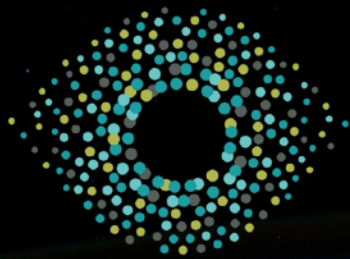


Graphical Web Apps



APIs

GraphQL



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THANK YOU!



Space Made Simple.