ATLAS Scheduling

Task Requests , Flex Scheduler, Partner Site Scheduling, and Scheduler Bridge

At ATLAS we continuously work to make communicating with spacecraft simpler and more efficient for our clients. This is exactly why we developed our unique **Flex Scheduler**. Unlike traditional scheduling strategies, ATLAS offers a far more dynamic approach. Through simulation and forecasting, ATLAS identifies a certain number of minutes that are guaranteed to be available per month, per spacecraft, per ground station. And ATLAS' Flex Scheduler accurately awards these minutes.

Our scheduler provides spacecraft operators with multiple options for scheduling their satellite contacts - called Tasks. All Tasks are scheduled on the ATLAS Federated Global Antenna Network by submitting Task Requests through our RESTful Freedom® API. Task Requests contain information that constrains when and where a Task is preferred. This defines the behavior of our system during the contact.

Task Requests support the following scheduling and execution behaviors: **Immediate, Exact, Minimum Duration, Flex (Before, After and Around), and Test.**

Task Requests

Immediate: Task must be executed ASAP

Exact: Task requires a specific start & end time

Min. Duration: Task duration can be shortened to this threshold

Flex: Task may be scheduled during any visibility within a large window of time (hours)

Test: Task mode for playback of TM Recordings, stored in S3

Scheduler Attributes

Scheduling: Available from 1 min - 2 weeks

Guaranteed Available Minutes: Based on Freedom Forecaster, per spacecraft, per site, per month
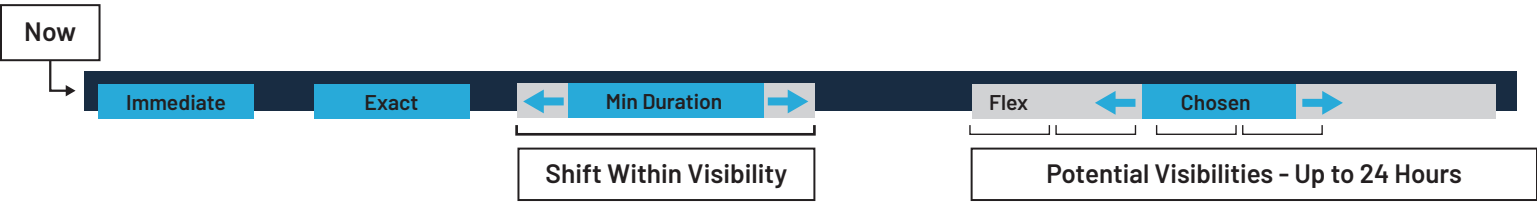
No Lockout: Scheduler supports all ConOps

Priority Mode: Scheduler supports Launch, LEOP, & spacecraft emergencies

Guaranteed Available Minutes: Clients requiring guaranteed minutes, typically will achieve those from Freedom Enterprise sites. Guaranteed minutes at any partner site is handled on a site-by-site basis, and is determined upon availability at the time of the Task Request.

Recommended Minimum Duration: ATLAS calculates the number of seconds of overlap each visibility has with all other satellites on the Federated Network. To maximize the likelihood of successfully scheduling, ATLAS provides a Recommended Minimum Duration, calculated as the full duration less the seconds of overlap. When creating Task Requests, setting the Minimum Duration to the ATLAS Recommendation will virtually guarantee successful scheduling.

Minimum Duration: The Flex Scheduler will always try to maximize Task Duration, up to the full Task Request. In cases of overlapping Task Requests, the Flex Scheduler will use the Minimum Duration field to flex the requests, yielding antenna time for everyone on our Federated Network. Setting the Minimum Duration above the Recommended Minimum may decrease the likelihood of successfully scheduling your Task Request. ATLAS recommends setting the Minimum Duration to the true minimum for your mission ConOps.

Now			
Immediate	Exact	← Min Duration →	Flex ← Chosen →
		Shift Within Visibility	Potential Visibilities – Up to 24 Hours

FreeTime API: Provides clients with knowledge of Open/Free time windows and the utilization of each antenna in the network, including federated sites (when available). The FreeTime API allows clients to interrogate the ATLAS schedule and programmatically build Task Requests that are extremely likely to be successfully scheduled.

Visibilities API: ATLAS' Service which returns visibilities for each spacecraft across the ATLAS Federated Network, while providing a view of the number of seconds overlapping with other client's visibilities. If zero overlap is found, the Task is guaranteed to be accepted, if requested. Non-zero of overlap means clients can quickly see if a visibility will meet your required minimum duration. Meaning you can request less time with confidence the Task will be scheduled.

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ATLAS is building and partnering to provide a global **federated network** of antennas. The ATLAS Federated Network is a network of networks that work together seamlessly, powered through AWS Cloud. ATLAS clients never worry about the differences between the network interfaces because ATLAS has designed our software to integrate them into a fused/unified mesh network. No one worries about sending a text message on AT&T and it being received correctly by a friend using Verizon, and now neither do spacecraft operators. The networks have integrated and become federated so that clients are completely unaware of the differences.

All the features of Freedom are offered at each Freedom Enterprise Site, and we offer as many as possible at all Partner Sites. Each Partner Site in our network is maximized, meaning we include every feature of Freedom that is possible to integrate at each ground site. This includes: Scheduling, Realtime TM/TC, data backhaul or recordings, Realtime metrics, just-in-time hardware configuration, and more.

The ATLAS Federated Network includes:

Freedom Enterprise Sites: Ground sites owned by ATLAS, or fully operated by ATLAS. We have the right to distribute all of the minutes on these antennas, and we are tightly integrated with the Hardware at each of these sites.

Digital Partner Sites: Ground sites where Freedom is fully integrated with the Partner Site via API(s). The interface is machine-to-machine (M2M) and automated. This model is typically used with Ground Station as-a-Service providers, ie. AWS Ground Station, ViaSat, etc.

Edge Partner Sites: Ground Sites where Freedom is fully integrated with the Partner Site via direct hardware access.

Scheduler Bridge & Partner Site Scheduling:
Through Freedom, the Flex Scheduler and Scheduler Bridge extend the reach of our network and scheduler to give clients the ability, and flexibility, to schedule the time needed for their pass. The Scheduler Bridge allows clients to schedule time on antennas - any ATLAS owned antenna, as well as our 3rd party partner sites.

The Scheduler Bridge seamlessly interfaces with any partner scheduler API, even schedulers that operate with a different ConOps than the ATLAS network. ATLAS clients are able to book time on any antenna managed by Freedom via a single API, both ATLAS owned (Freedom Enterprise) and both Digital and Edge partner antennas.

With the ATLAS Federated Network, enjoy the freedom of a scheduler, on a personal device near you, that fully realizes your mission ConOps.

ATLAS Federated Network ✧ Flex Scheduler ✧ Scheduler Bridge

Freedom® API → Schedule Task (*Exact or Flex*) → Flex Scheduler → Freedom Enterprise Network → Pass / Task Confirmed

Scheduler Bridge → Digital Partner Network → Pass / Task Confirmed

Edge Partner Network → Pass / Task Confirmed

Flex Scheduler + Scheduler Bridge Benefits

- Flexible Task Requests
- FreeTime Discovery
- Last-minute Scheduling
- Guaranteed Minutes (per spacecraft per site)
- Federated Network Global Access
- Flex Scheduling