

# UNOLS Fleet Wide Internet Policy

Consistent Internet Access Experience and  
Administration



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Satellite Network Advisory Group

<https://satnag.unols.org>

# Objective

To administer functional, robust, and consistent user **Internet access experiences** across vessels in the UNOLS Fleet by establishing a consistent set of policies for managing **Internet resource allocation**. Consistent application across UNOLS will provide defensible and accountable metrics in order to scale bandwidth responsibly.

Vessels operating on satellite-based Internet connections face continuous challenges providing **affordable** and **usable Internet access** for **Science** and **Vessel Operations** purposes, as well as **general purpose use for all persons**.

In order to maintain **functional, equitable and fair use** of this limited resource it is **necessary to manage** access to Internet access consistently for the fleet.

Also available as a Google Doc:

<https://docs.google.com/document/d/1jOidbvs71uEqINVOE2fkoOhOhslwzAOz7G83ENttvQU/edit?usp=sharing>



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# Timeline: May-Oct 2018 Proof of Concept Adoption

Policy adoption is to be uniformly **proof of concept tested** on vessels from **participating SatNAG institutions** including:

- **SIO/UC San Diego**
- **Woods Hole Oceanographic Institution**
- **University of Washington**
- **University of Alaska Fairbanks**

This will include proof of concept testing policy adoption on 8 UNOLS Vessels:

- **R/V Roger Revelle** (SIO - Global Class)
- **R/V Sally Ride** (SIO - Ocean Class)
- **R/V Robert Gordon Sproul** (SIO - Coastal Class)
- **R/P FLIP** (SIO)
- **R/V Atlantis** (WHOI - Global Class)
- **R/V Neil Armstrong** (WHOI - Ocean Class)
- **R/V Thomas G. Thompson** (UW - Global Class)
- **R/V Sikuliaq** (UAF - Global Class)



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# Timeline: Oct 2019 Next Generation Lifecycle Updates

By Oct 2019, as part of a lifecycle maintenance process the SatNAG Group will have evaluated and recommend updated technical and policy solutions for the the UNOLS fleet to serve for the next 3 years. After, new solutions will be evaluated on a periodic basis.



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# Policy: Internet Use Purpose

UNOLS vessel Internet resources are provided **primarily** in support of **funded science** and **vessel operations**. Use for purposes outside of the primary purpose is permitted on a non-interference basis.



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# Policy: Acceptable Use

Users of UNOLS vessel network resources must agree to the **NSF/UNOLS Fleet Wide Network Usage Policies**. We recognize operating institution network usage policies and per-vessel network usage policies may be considered on a case-by-case basis and will work with individual operators as-needed.

Accounts are allocated on a per-user basis; every person using agency-funded Internet link is accountable for their use. **Sharing account passwords**, using another person's account, attempting to create multiple accounts, accessing restricted resources, or exceeding allocated quotas **is not permitted**.

For the purposes of managing limited Internet capacity it is **necessary to monitor network usage** to identify inefficiencies and high resource consumers.

**Abuse of these terms of service** may result in **revoking permissions** or resource access.



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# Policy: Captive Portal

In order to be able to **measure** and **managed per-user Internet resource access** it is necessary for Internet access to be placed behind a **Captive Portal** device which requires per-user login for Internet Access.

Internet management should operate on the “**principle of least surprise**”. Captive Portals are ubiquitous on public networks and therefore reasonably intuitive to use while allowing for individual user accountability across multiple devices.



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# Policy: Captive Portal Usage Quotas

A **daily per-user bandwidth usage quota** should be established on limited Internet links for several reasons:

- **Fair use and equal quota allocation** for all users. No special tiers for users. All users both science and crew have the same Internet Access
- To simplify user expectations management **quota will not change frequently**. Quotas will be based on functional network metrics to maximize both use and reliability of access to Internet resources.
- Ideally, UNOLS would use a single, fleetwide number for quotas, but practical details of this are being worked out.
- The Internet Quota will be approximately based on available bandwidth divided by the number of users. A Bandwidth Calculator has been developed to assist in estimating daily user quotas: <https://satnag.unols.org/quotacalc>

**E.G. Internet Usage Quota Per User Per Day**

**150 MB Up / 150 MB Down**



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# Policy: Captive Portal One Device per User at a time

For several reasons including TCP session capacity, device chatter, and simplifying quota management for users, Internet access will be presently limited to one device at a time, per user.

Modern computers are typically attempting to maintain ~1000 TCP sessions to the Internet. 50 computers connected over the satellite link will compound to ~50,000 TCP sessions simply trying to be kept “up”.



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# Policy: Captive Portal Blocked or Throttled Services

In general users will have discretion to choose how they would like to use their daily quota. And as such most services or websites will not be blocked or throttled.

However for those services that consume large amounts of bandwidth and are frequently saturating the vessel network connections these services may be blocked or throttled on a fleetwide basis. These may include:

- Cloud-based file sharing such as **DropBox, iCloud**
- General file sharing services, such as **SAMBA**
- Off-ship **network-printers**
- Backup services, such as **CrashPlan**
- Operating system updates
- Advertisements



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# Policy: Captive Portal Per Host Internet Access

Vessels commonly have public, science or operational kiosk (also known as clientless) systems configured with unrestricted Internet access from which users can browse the Internet without impacting personal quotas. Use of kiosk for personal Internet Access should be minimized in favor of Captive Portal Access.

## **Kiosk and clientless hosts should be limited to ~6 system per vessel.**

**Public Kiosk** - Shared login computers in open public spaces for use by anyone science or crew on a first come first served basis.

**Science Kiosk** - Typically a short list of transient science operations systems which are key to the mission and designated by the P.I. for a given cruise for less restricted Internet Access.

**Operational Kiosk** - Typically these are permanently installed computers on vessels in locations like the bridge, and engineering.

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**Infrastructure Systems** - Typically these are IT or Science Operations servers which automate data processing or IT tasks between ship and shore. These system may have unrestricted Internet access but are not used for personal Internet access or web browsing.



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# Policy: Exceptions and Quota Resets

Effective policies are those for which the vast majority of services can function within the boundaries of the policy framework. However **there will always be scenarios for which exceptions to the policies need to be made**. As long as **exceptions are rare and not common**, the policy is working.

Policy exceptions will ideally be requested, reviewed and approved prior to implementation. For instances which are urgent, at a minimum they **must be documented, justified and communicated** within a reasonable amount of time.

**Per User Quota resets** should only be requested **for justifiable business purposes**. Ideally there will be a user accessible interface to request and track Quota resets.



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# Policy: Metrics and Reporting

A key component for the successful management of Internet access will be to have **targeted and trending metrics** which provide an ‘apples to apples’ meaningful **comparison of traffic usage between vessels** and over the same timeframes with the same sample rates.

Automated and **regular reports** should be generated from metric data for delivery to the SatNAG group for **routine monitoring**, and to NSF and UNOLS administration for **accountability purposes**.



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# Guidance Documents

To minimize **technical debts** and facilitate a more **consistent outcomes**, ideally SatNAG will be able to administer and configure fleet wide policies using **automated** process and **configuration managed** devices which **self document**.

However, there will be a need to **document and train on manual procedures**. SatNAG maintains a wiki with documentation for **best practices, tips and tricks**, and **procedures** to assist the UNOLS community toward efficient resource management.

- [satnag.unols.org/wiki/satnag](https://satnag.unols.org/wiki/satnag)



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# Technical Solutions: Lifecycle Updates

As this project evolves and matures solutions targeted for a **3 year life cycle** will be evaluated on a number of criteria including:

- **Feature Sets**
- **Fit for Purpose** ([Network Device Requirements](#))
- **Cost**
- **Technical Debts and Maintenance**

Devices will be considered for the following **functional areas**:

- **Firewall**
- **Captive Portal**
- **WAN Aggregation**

Ideally one device can be identified which will meet all 3 functional areas and one for which **licensing and maintenance contract can be centrally managed** for the fleet. While not an exhaustive list the following is a small list of devices being considered:

- **Cyberoam / Sophos** (Captive Portal / WAN Aggregation)
- **Peplink** (WAN Aggregation)
- **Cisco Meraki** (Captive Portal)
- **Untangle** (Captive Portal / WAN Aggregation)
- **Traffic Sentinel, Security Onion / Bro** (For Network Monitoring and Metrics)



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