United States Antarctic Program

USAP Vessel Fleet Broadband Use

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RPSC Vessels

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Raytheon
Polar Services

Overview

- Background
- Services
- Initial Testing / Current Configuration
- Way Forward

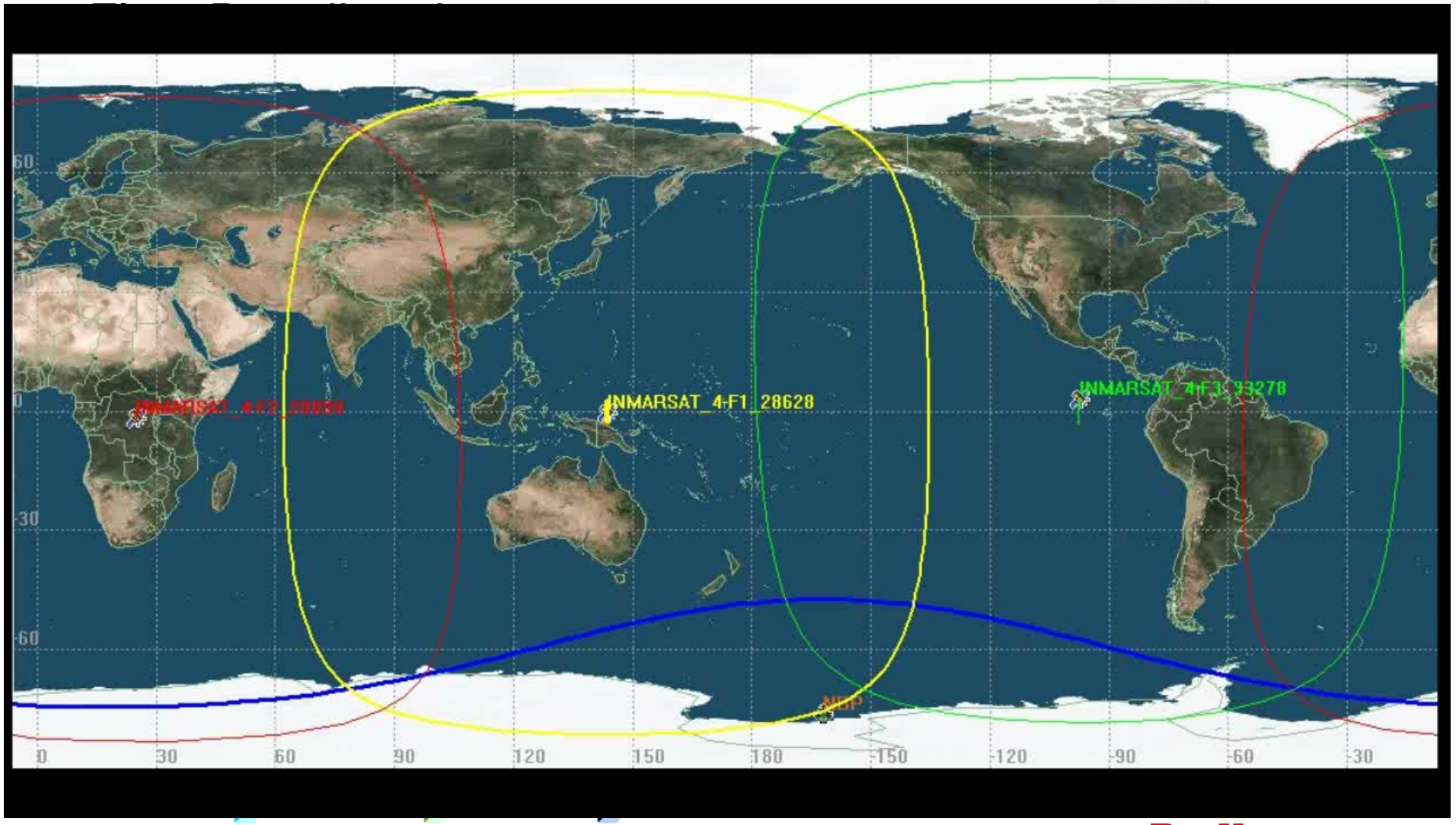
Background

- USAP Research Vessels (Pre 2010)
  - Fleet 77 system
    - ISDN connections back to Denver to transfer bulk e-mail and files
    - Cost of service was ~ **$24/MB** ($3300/month/ship)
- Installation of FBB systems on the Laurence M. Gould (LMG) and Nathaniel B. Palmer (NBP) completed in early 2010.
  - Early deployment was focused in moving all services from the Fleet 77 system to the FBB system (E-mail & File Transfer)
- FBB monthly quota – 2 GB/ship

Background Cont'd

- USAP grantee requests for Internet access
- LMG and NBP
  - LMG 47 passengers (32 Passengers 15 crew)
    - 2000/47/30 = ~ 1.4 MB/person/day - Not sufficient
  - NBP 66 passengers (42 Passengers 24 crew)
    - 2000/66/30 = ~ 1 MB/person/day - Not sufficient
  - No solution for USAP vessels without greatly exceeding the initial 2GB/month offering
- Initial UNOLS fleet offering is being underutilized
  - Some vessels are not in service
  - WHOI approved USAP to exceed its initial set allocation

Service Capabilities



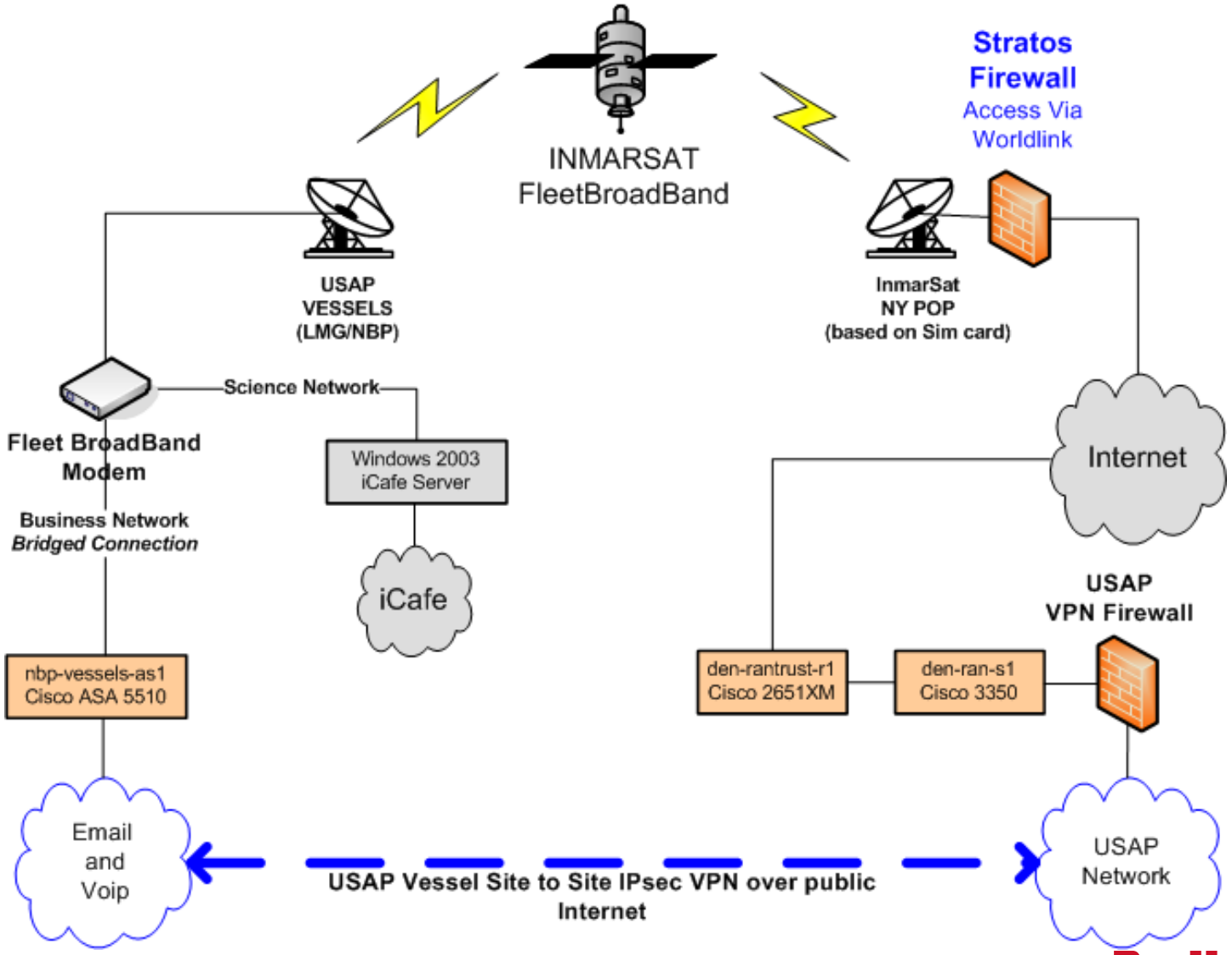
FBB Services

- Provide E-mail transfer service
  - Remove the F77 Ffastest ISDN data service
  - IPsec tunnel to DHQ
  - Modify the current scripts to work through a TCP network
- Provide IP phone service
  - IPsec Tunnel to DHQ
  - Set up DHCP parameters to point IP phones to Denver call managers
- Provide Internet Access
  - Requires additional software for bandwidth management, security and user identification

E-mail and IP phones

- Hardware
  - Cisco ASA 5510
    - Enterprise class firewall that meets security requirements
    - Can produce a stable IPsec tunnel over a low bandwidth, high latency connection
    - Has an additional “user friendly” interface (ASDM) for diagnosing issues by non-network savvy users.
- IPsec Tunnel – 10% overhead

LMG & NBP FBB Network

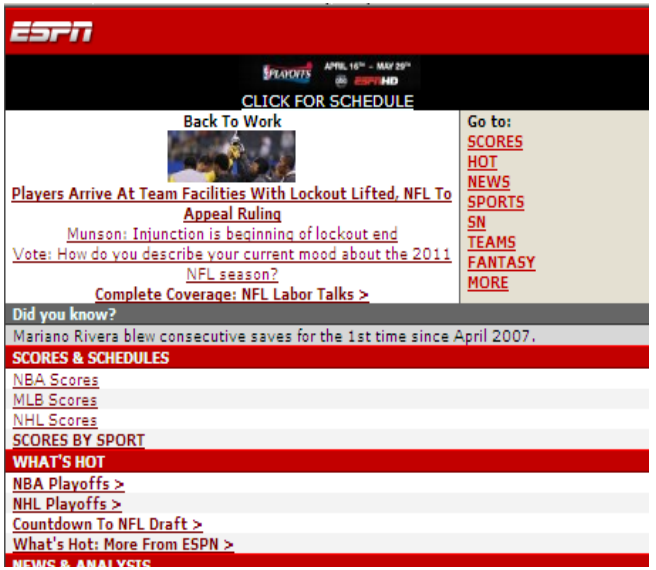


Internet Access - Testing Parameters

- Provide users Internet access
- Monitor the amount of data transferred through the system
- "Best Effort" Security
  - Manage/Monitor Usage
    - Inappropriate sites
    - EntROB compliance
  - Isolate from ship network
    - Protecting from malware or other malicious exploits
- Will not affect normal ship operations
  - E-mail
  - File Transfer
  - IP Phones

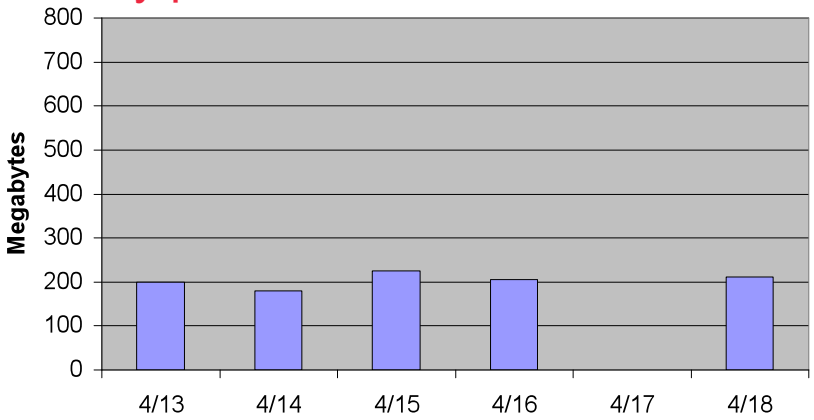
Initial “Café” Deployment (LMG)

- Internet Café
  - Two hours per day - 15 minute sessions
    - First hour dedicated for science
    - Second hour open to science and RPSC
  - Ten Hours per day – No set sessions
  - Only allow non-USAP assets to connect
    - No Enterprise security protections in place
  - Locate the Internet Café in a common area
    - **Create a self policing environment**
  - Provide antivirus updates locally
  - Provide a list of mobile sites
  - Provide Wireless Access



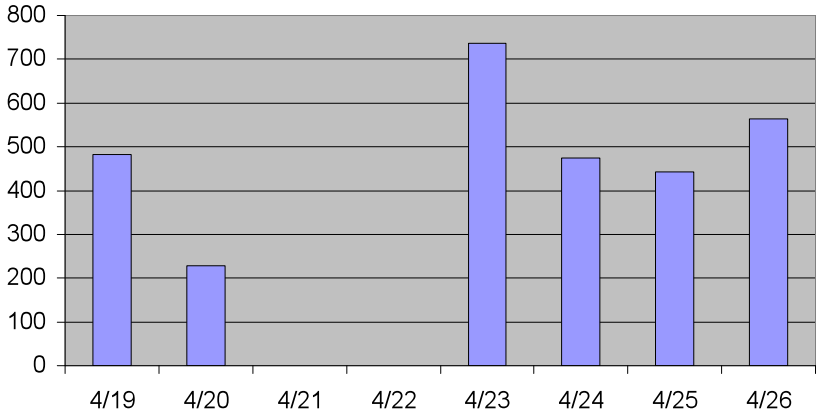
LMG Time Restricted Test Summary

- Two hours per day did not offer enough time for users to complete all tasks
- Wireless access greatly increased the number of simultaneous users – Mobile devices
- Very positive feedback



Café Two Hours/Day

204 MB/day



Café Ten Hours/Day

487 MB/day

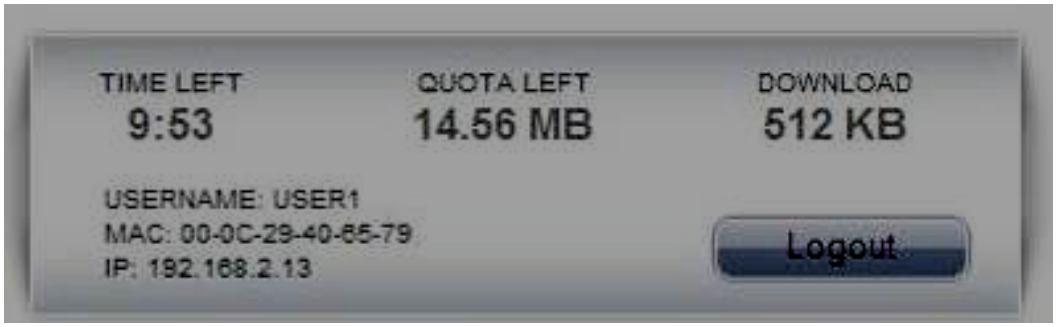
Test Summary

Duration: 11 days	Total: 7.5 GB
Café: 4.0 GB	Operations: 3.5 GB
$11,400 Cruise	$1100/day

~20 GB/month

Quota Management - Tools

- Internet Café Software
  - Used in Internet Café and Hotels
    - Majority operate on a time based allocation
    - Limited functionality for quota management
  - Requirements
    - User authentication
    - Ability to set daily/weekly quota per user
    - User scheduling
    - Reporting
  - Additional functions
    - URL tracking
    - Port filtering
    - Bandwidth management



Internet Café –Configuration

- Antamedia Hotspot Software
- Quota Management
  - Per User Basis
  - 100MB (Initial) to 10MB (Current)
- Bandwidth Management/Optimization
  - Per User Basis
  - 128 Kbps (Initial) to 32 Kbps (Current)
- Enhance security controls
  - Content Filtering
    - "Poor man's" content filtering using http://someonewhocares.org/hosts
  - Port blocking
    - Security generated list
    - Port blocking for Windows Updates and MAC updates

Way Forward
Striving to Meet NIST security guidelines

- Manage/Monitor Usage
  - Inappropriate sites
  - EntROB compliance
- Isolate from vessel network
  - Protecting from malware or other exploits

- **Route all Internet bound traffic through DHQ**
  - Dynamically updated content filtering (Bluecoat)
  - Intrusion detection system (Sourcefire Defense System)
  - IPsec tunnel will create 10% overhead

Way Forward

- WAN Optimization
  - Riverbed Steelhead Devices
    - Used at South Pole, McMurdo and Palmer stations
    - Improve bandwidth usage up to 52%
      - Caching – Bit Matching
      - Application Optimization
        - CIFS, RSYNC, NFS, HTTP, SSL
      - Packet Shaping
    - Skipware – Satellite Optimization
- As a bare minimum we would see a 40% increase utilizing this technology.

Additional Funding Required

Questions??