U.S. Antarctic Program Resupply Perspectives

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Antarctic Infrastructure & Logistics

Why McMurdo Station?

* Deep water access for ships
* Relatively stable ice edge
* Annual sea ice breakout
* Access to Ross Ice Shelf and the continent
* Critical for access to South Pole & deep field.

Vessel Operations
Early Operation Deep Freeze

* Ice edge cargo transfers
* McMurdo break-in for fuel resupply
* Unpredictable ice conditions increase risk.
* Personnel losses
* Cargo offload at McMurdo started mid-1960's.

Vessel Support Over the Years

* 1950's
  * US Navy ships
  * Navy & USCG operated icebreakers (smaller)
* 1960's
  * US Navy transfers all icebreakers to USCG
* 1970s
  * NSF assumes full responsibility for USAP.
  * USCG commissions Polar-class breakers
* 1980's
  * Introduction of civilian ships
* 2000's
  * B-15 iceberg creates need for 2-ship ops
  * NSF contracts with FESCO for icebreaker support
  * NSF contracts with Sweden for ODEN
* Present
  * MAERSK PEARY (tanker)
  * GREEN WAVE (dry cargo)
  * VLADIMIR IGNATYUK (icebreaker)

Key Considerations for Ships

* Icebreaking or ice-strengthened
* Must burn light fuels (MGO)
  * 2011 IMO rule
  * Increases cost – limits availability of backups
* Self-supporting for offload/onload (limited port facilities)

Icebreaker Support

Vessel Support over the years

Ice Wharves and Piers

* Mid-1960's abandoned ice edge as routine site for cargo offload.
* Introduction of containerized cargo meant higher weights and increased risk of ice edge transfers.
* Improvements to "Edisto Quay" from 1969-1973.
* Ice wharf destroyed in winter storm in 1973.
* USAP switched to ice pier. (1973-present)

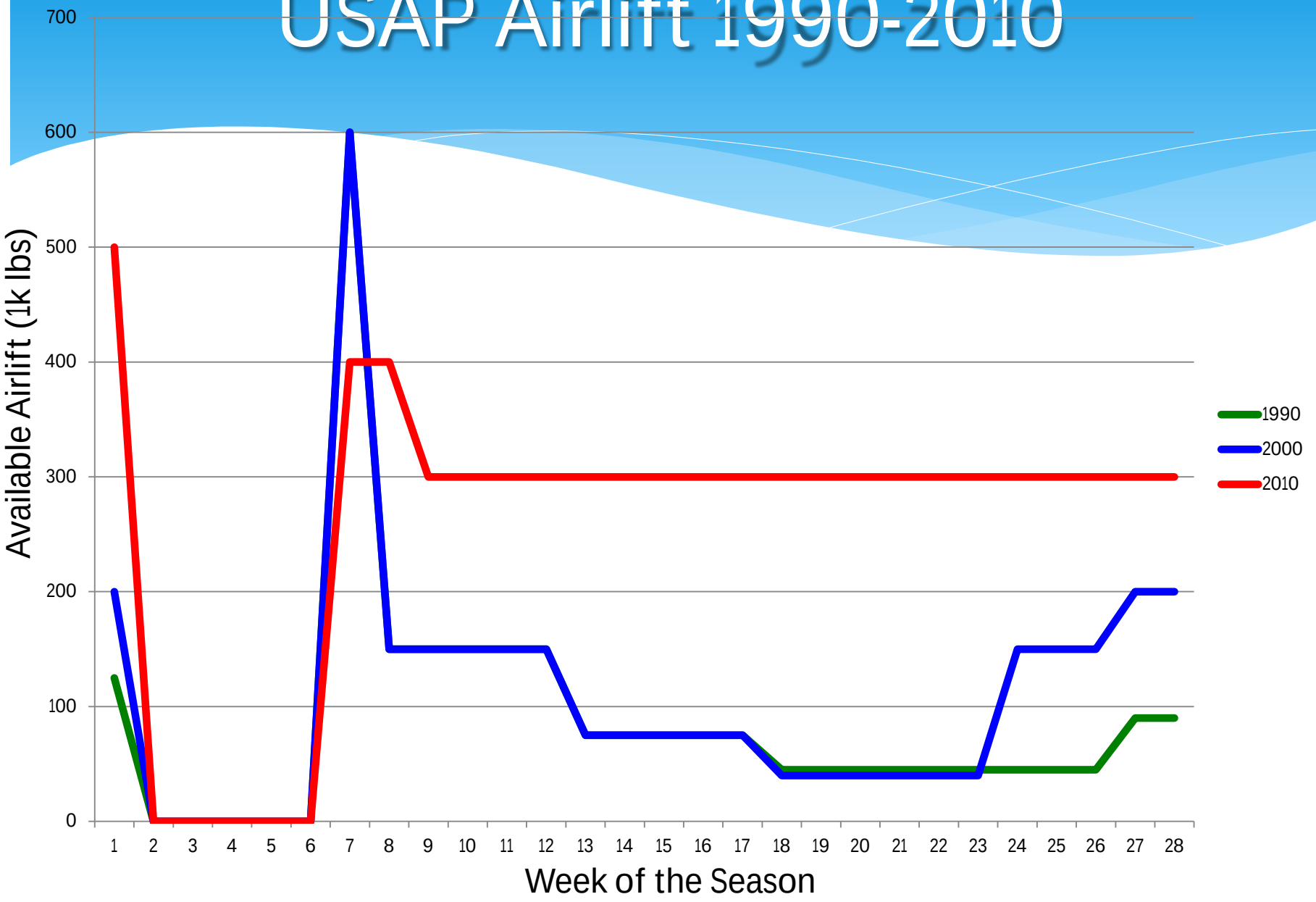
Modular Causeway System

* Ice pier not suitable for cargo offload
* US Army providing MCS and 40-person team to assemble.
* Down and back on cargo vessel
* 3 days setup / 3 days teardown

USAP Cargo Vessel Movements

* Southbound cargo volumes vary greatly with on-ice activities. Construction activity = more weight
* Some cargo cannot be easily flown
  * Hazardous cargo
  * Frozen foods
* Rolling stock & breakbulk
* Northbound cargo drivers
  * Solid & Hazardous waste
  * Science cargo
  * Outsized items
* Backlog of non-hazardous retrograde

USAP Airlift 1990-2010



Transformative Capabilities

* Pegasus Runway
  * First WINFLY/Late-Season use
  * White-ice development 2002 led to year-round wheeled ops by 2004
  * Greater flexibility in aircraft types
* C-17 Globemaster 3
* South Pole resupply capability – traverse and air support