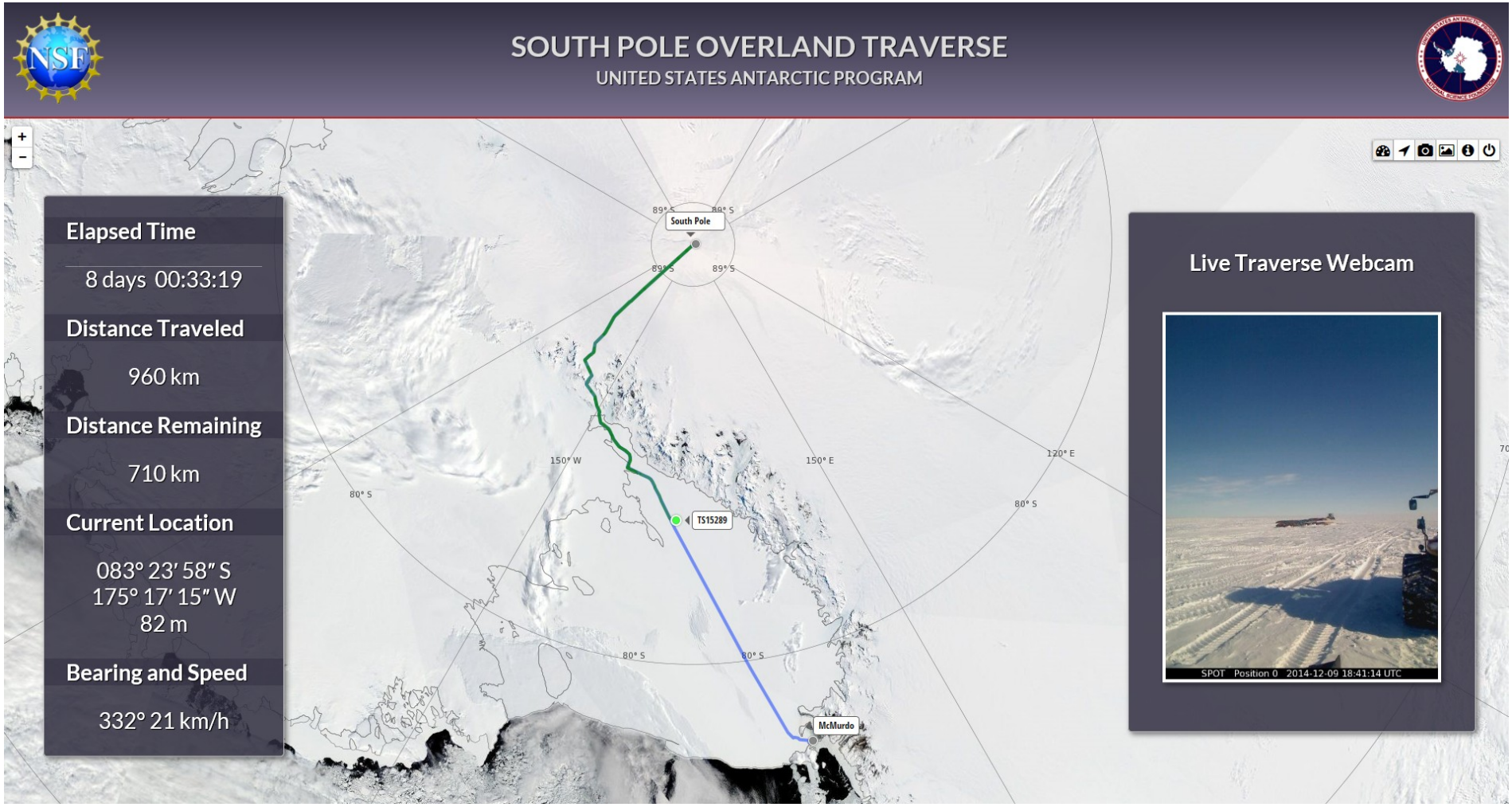
Executive Summary

2014 Pilot Effort



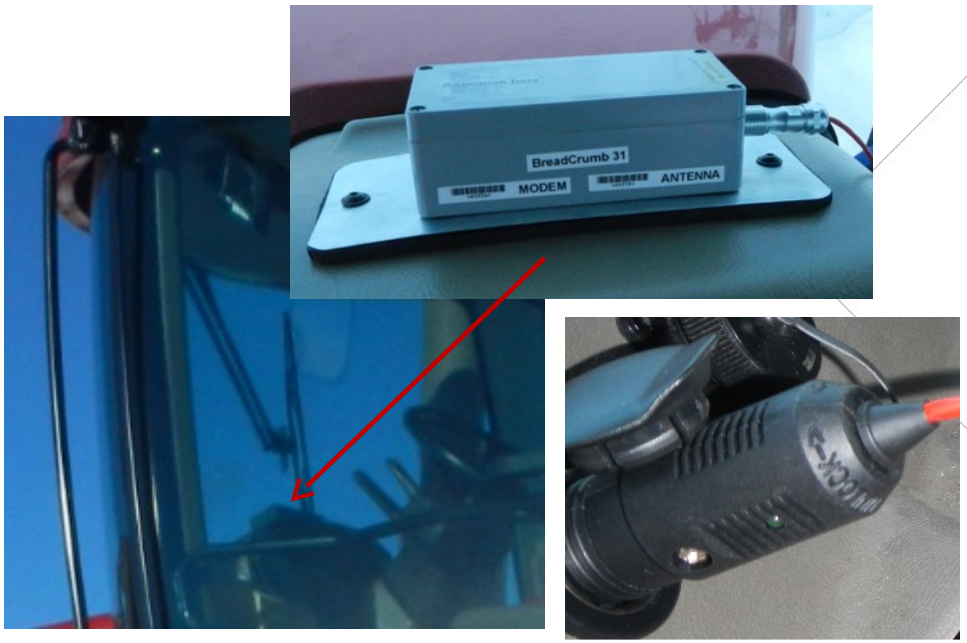
Innovations

- Collaboration
  - Lockheed Martin
    - Antarctic Support Contract
  - CH2M Hill
    - SRI International
- NSF community knowledge
  - Capitalized on existing ASC/SRI Iridium systems relationship
    - ASC Provides Iridium administrative and technical support to both the Antarctic and Arctic effort
  - Initially developed for the Greenland Inland Traverse
  - Concept origination occurred at the Polar Technology Conference
    - Concept broached April 2014
- Technology
  - Iridium modems
  - Single board computers
  - Custom coding by SRI
  - Stereographic Map
    - Suitable for rendering waypoints and track below longitude 80° South
- Resources
  - Utilized existing resources
  - Temporary installation
  - Hardware redeployed December 2014
  - Minimal funding
  - Time
    - Work authorization August 2014
    - Fielded October 2014

SBD Based Tracking System

Temporary installation

Mounted on tractor steering column cowling



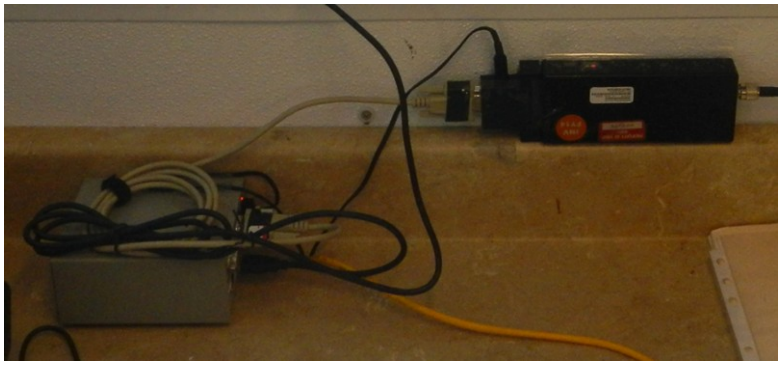
Powered by 12V DC auxiliary power socket

Each waypoint's metadata is captured and viewable on Web GUI

received	2014-11-01 17:08:39+00
timestamp	2014-11-01 17:08:37+00
emergency	f
latitude	-77.8411
longitude	166.894
altitude	10
speed	1.62
course	127.63
vertvel	0
fix	t
satellites	9
hdop	0.84
vdop	1.65
motion	f
inputPins	216
outputPins	0
tracker_imei	3.00234e+14

RUDICS Based Camera System

RUDICS based camera system mounted in window of kitchen sled



Iridium Modem and single board computer

Temporary installation
System on table behind laptop
Antenna mounted in skylight

Results

- SPOT 1 successfully tracked
  - SBD
    - Waypoint tracking and metrics
    - 60 second intervals
    - 2 minute latency
  - RUDICS
    - 87 MB of images transported
      - Over 43 days @ 10 min intervals

SPOT1 2014

? Future Applications ?

- Easily applied to:
  - McMurdo
  - Palmer
  - South Pole
  - Deep Field Camps
  - Vessels
- Applicable to:
  - Land
    - Snowmobiles to Ivan
  - Sea
    - Zodiacs to Ships
  - Air
    - Helicopters to C-17
      - Requires integration of data feed from similar technology such as Blue Force Trackers

- Search and Rescue
  - Identify last known coordinates
  - Response coordination
  - Collision/rollover detection
- Technology innovations
  - Wearable devices are viable
- Command and Control
  - Situational awareness
  - Offshoring potential
    - Workforce/facilities consolidation
- Archives
  - Ice Road traffic analysis
  - Human activity data capture
    - Impact studies

Required Refinements

- SPOT Tracking
  - Management and operator support
  - Permanently installed
  - Require “no touch” by vehicle operators
  - Provide for own power
- General
  - Refine web GUI
  - Refine software
  - Hardware engineering
  - Funding
  - Vehicle computer interface
- Station Operations
  - Management and operator support
  - Concept of Operations update
  - Fully developed hardware/software
  - Operator training
- Offshoring
  - Bridge Land Mobile Radio to global Push To Talk capability
  - Robust WAN
  - Failover to local operation

The End ?