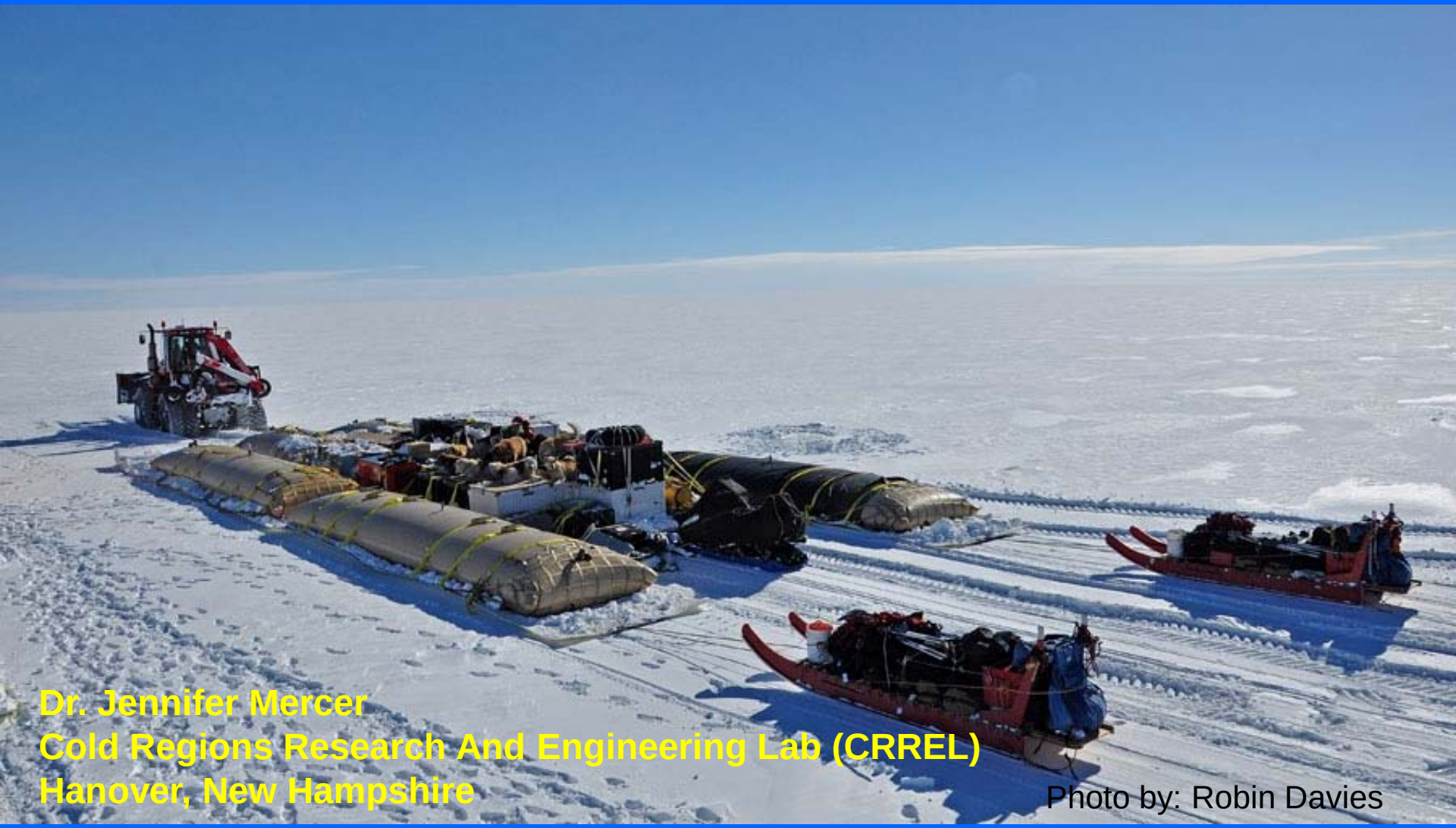
Greenland Inland Traverse (GrIT)



Dr. Jennifer Mercer
Cold Regions Research And Engineering Lab (CRREL)
Hanover, New Hampshire

Photo by: Robin Davies

What is GrIT?

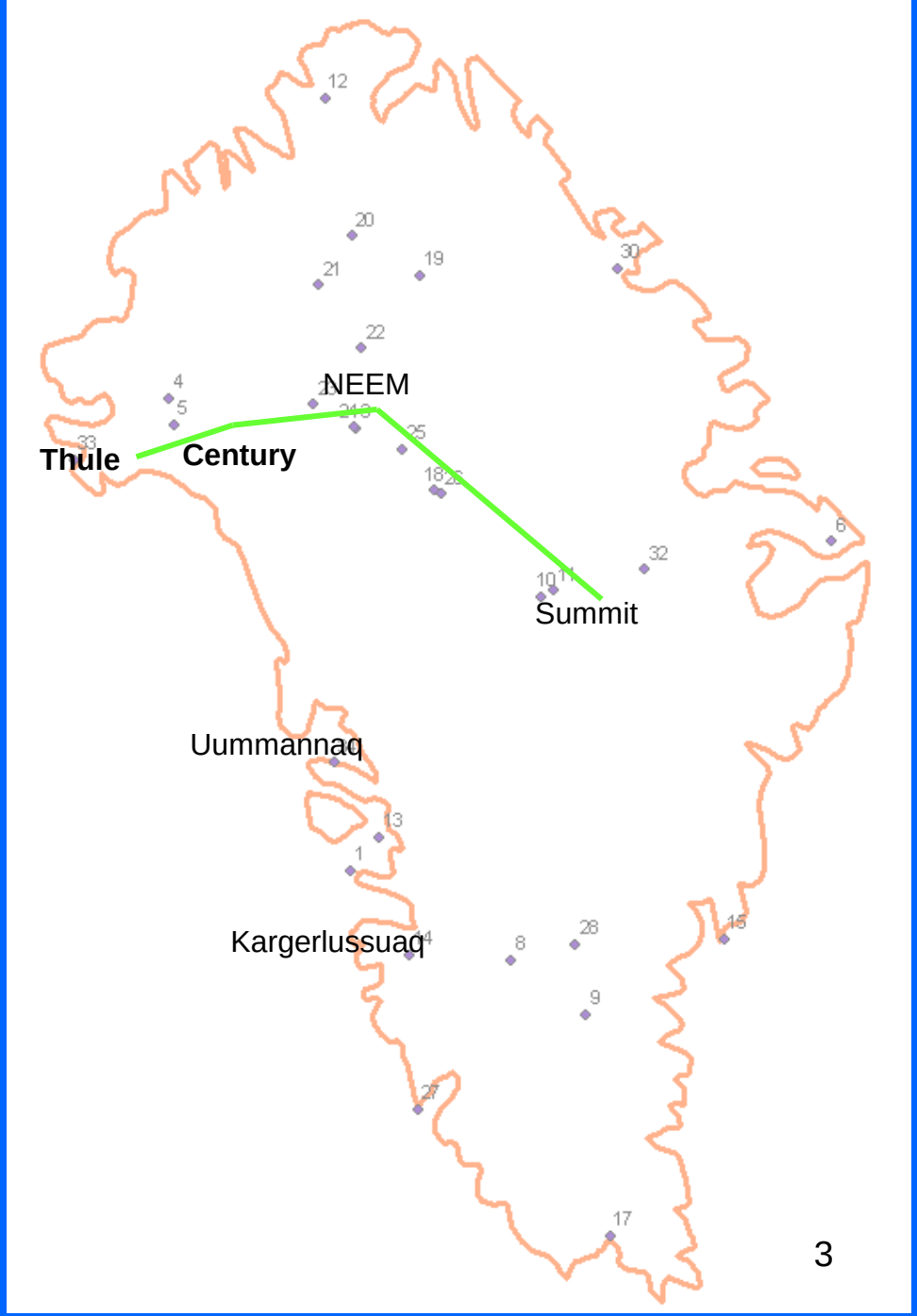
- Joint operation involving NSF, CRREL, and the Arctic Research Support and Logistics Services Contractor
- Proof-of-concept traverses in 2008, 2010
- Work closely with Antarctic traverse operators (NSF, CRREL, AIL contractor) to develop/test traverse technology by leveraging field seasons

Photo by: Robin Davies

Thule AB to Summit

Why Thule?

- Deep Water Port
- Further North = less susceptible to melt
- Shorter distance to Ice Edge
- Route previously used for Camp Century
- Can also provide fuel/supplies to NEEM



Why Traverse?

- LC-130 costs $6800/hr (projected in 2009), thus traverse breaks even at 10 bladders/tractor.
- A 20% increase in LC-130 costs ($8200/hr) would allow traverse to break even at 8 bladders/tractor.
- Cost savings by shipping bulk cargo to Thule vs. flying to Kangerlussuaq
- Cost savings by pre-fabricating and traversing new buildings for Summit Station
- Reduced emissions (approx. 1/100th vs. LC-130)
- Ability to support mobile/remote science camps, reducing air support costs

Proof-of-Concept Vehicle Fleet
GrIT 2008 and GrIT 2010

Successes To Date

- Established a 705-mile crevasse free route in 2008 from Thule to Summit, initial delivery of fuel/cargo
- Established a 740-mile safe route with deviations to improve mobility in 2010
- Delivered 257,608 lbs cargo to Summit in 2010 (175,708 lbs fuel/cargo + 81,900 lbs vehicles)
- Mobile science projects are being supported by traverse (Courville and Hawley, NASA ICE Bridge, Go North!)
- Established process for remote and on-site route planning to insure safety

Current Challenges

- Road between Thule and the Transition
- Variable transition conditions (old TUTO site)
- Dynamic route – glacial morphology
- Seasonal vs. global climate issues?
- Cargo capability – concept cargo sled design and testing
- Mobility Challenges
- Crew Quarters
- Increased Science Support Requests

Road between Thule and Camp TUTO

Transition w/Snow

Transition w/Snow

Transition w/Snow

Transition w/Snow

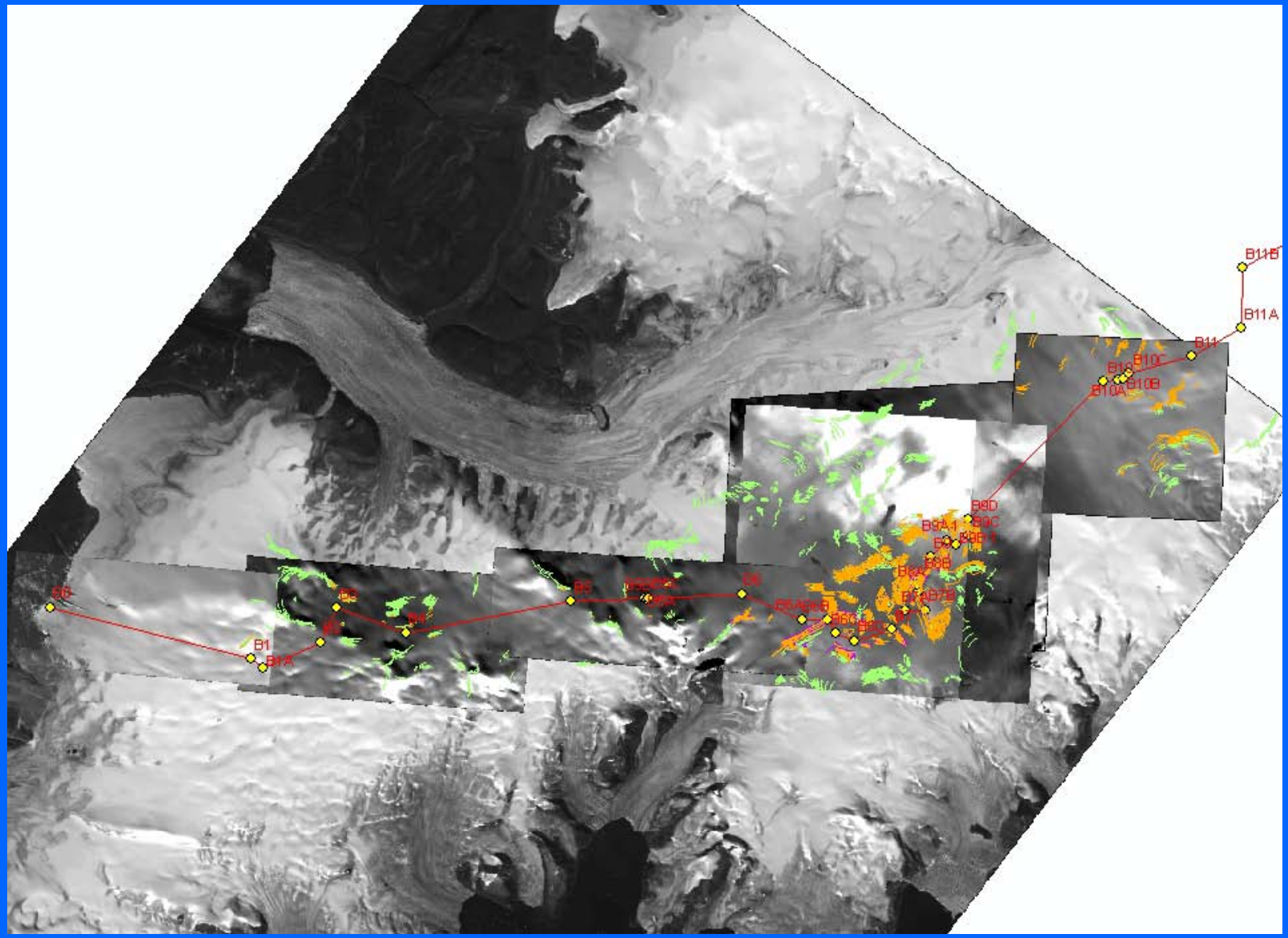
Transition w/Snow

Transition w/out Snow

Transition w/out snow

Seasonal Wash-Outs in Transition Area

Challenging Transition onto Ice Cap



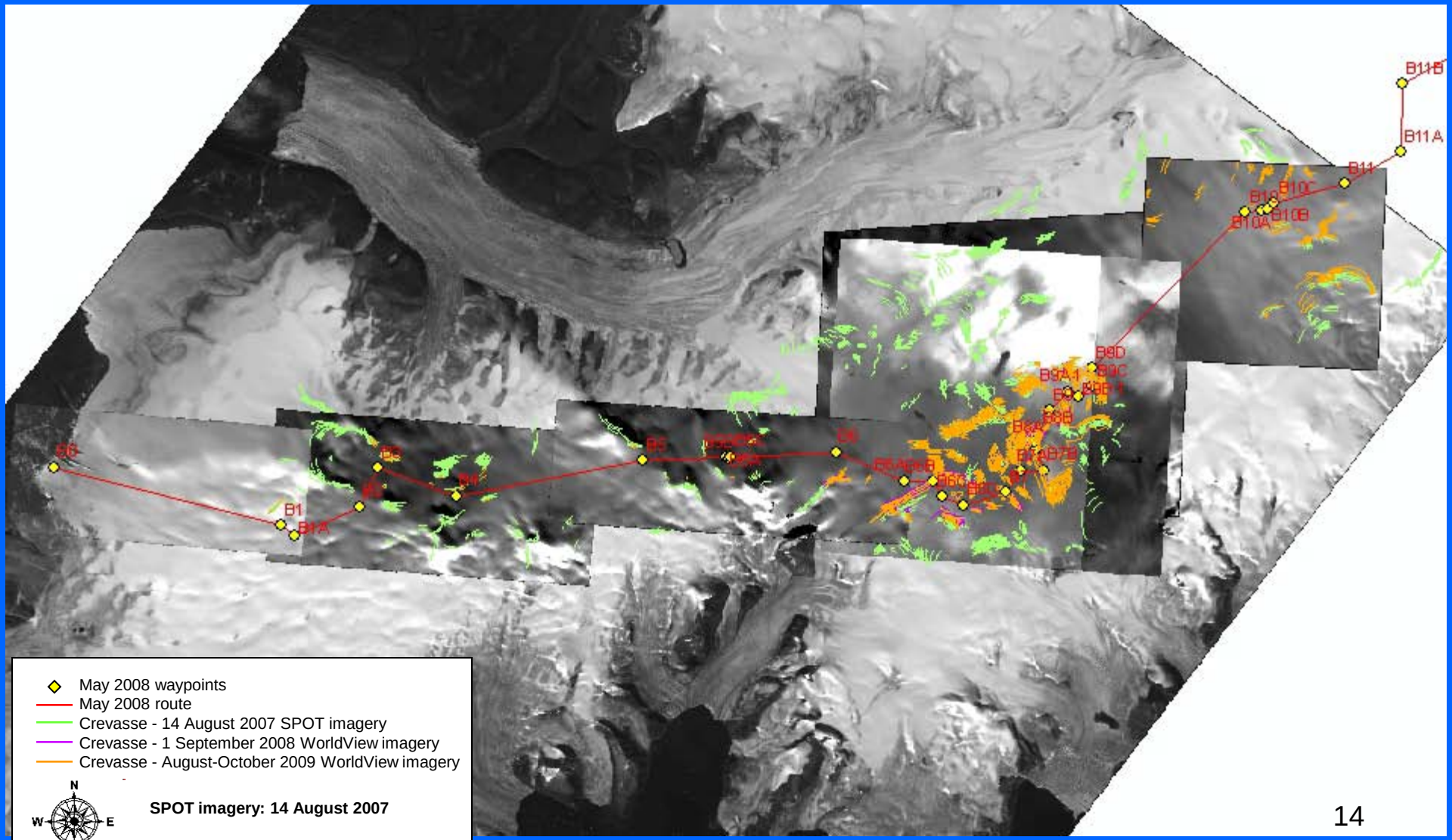
Aerial Survey w/GPR to locate Crevasses

Robotic GPR Survey

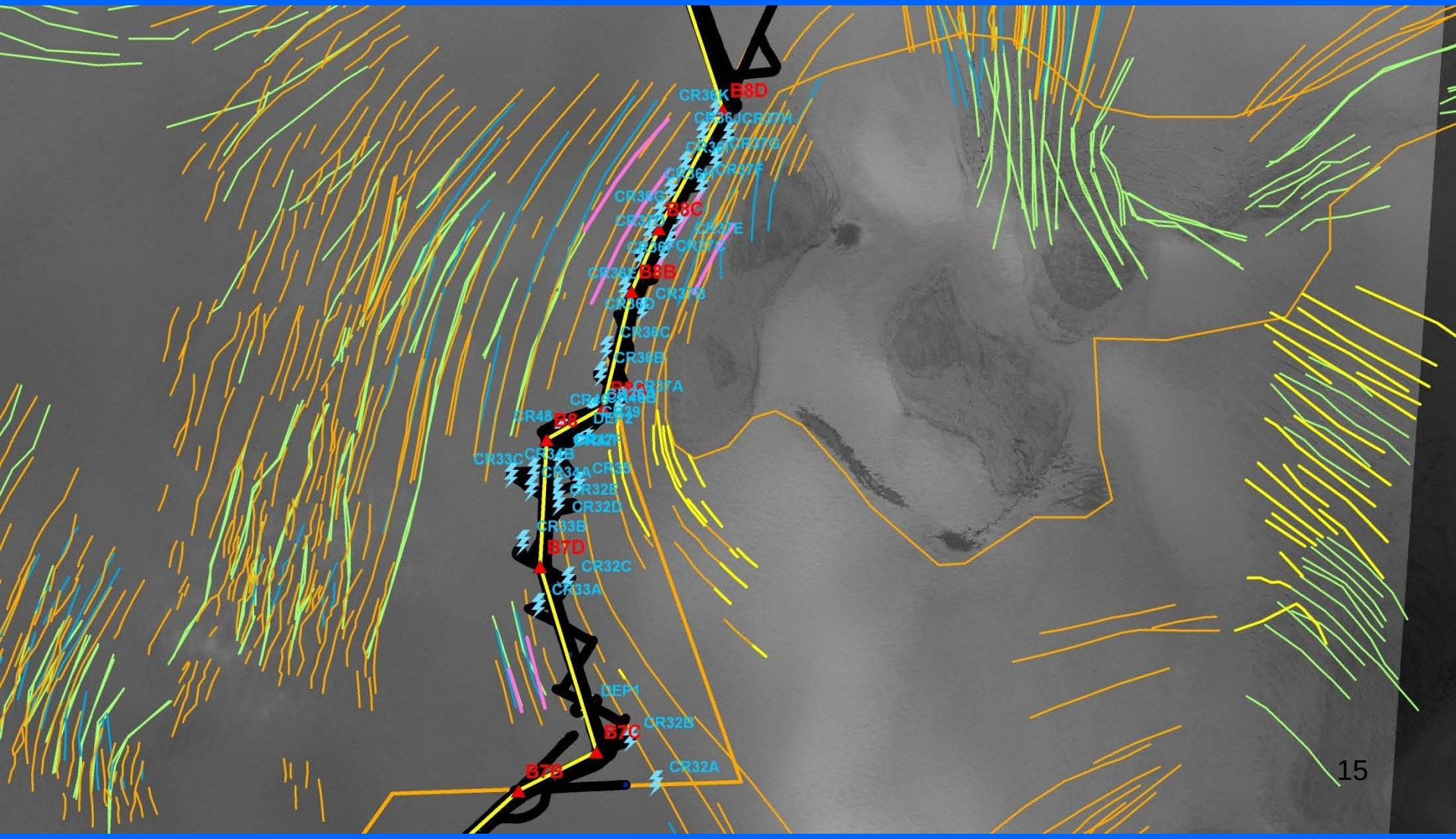
Open and Closed Crevasses

GPR survey on the Ground

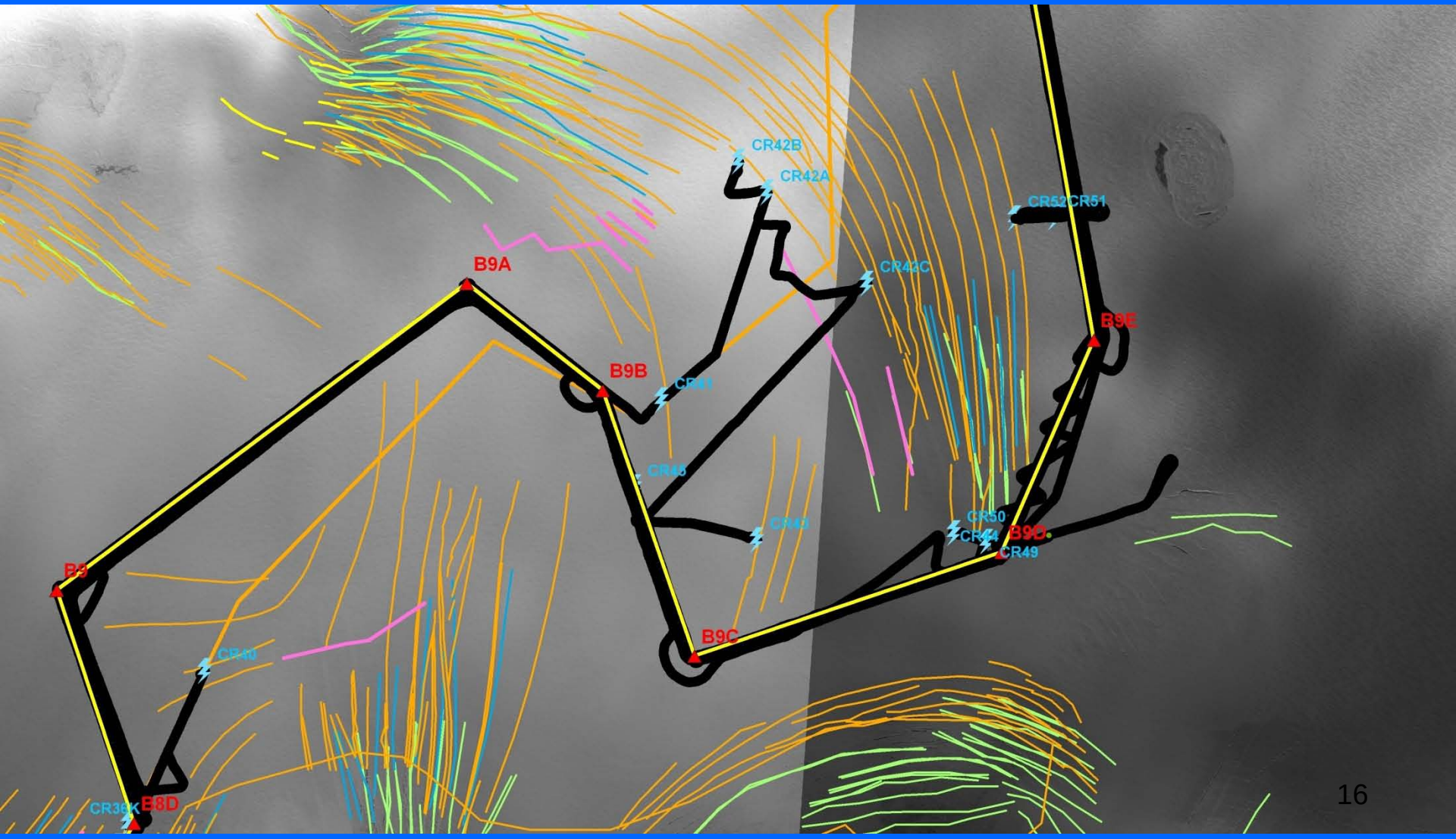
Dynamic Route



Threading between Crevasses



New Crevasse Fields formed between 2008 and 2010



What's Next?

- GrIT 2011
- Continue Route Safety Assessments
- Continue delivery of fuel/cargo transport
- Continue science support

Photo by: Robin Davies

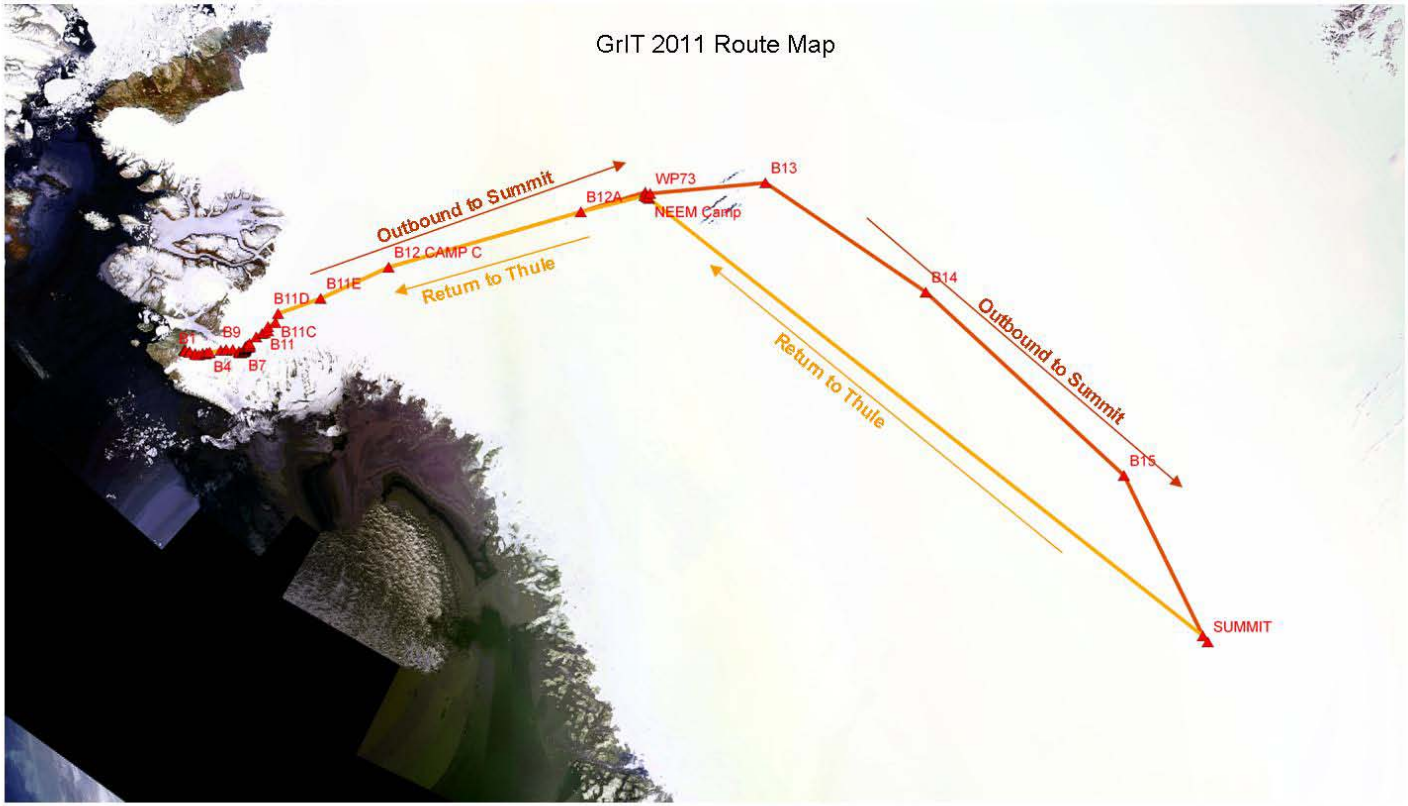
GrIT 2011 Fleet

Photo by: Pat Smith

GrIT 2011 Cargo Sled Tests

Photo by: Jim Lever

GrIT 2011


GrIT 2011 Route Map
Outbound to Summit
Return to Thule
B12 CAMP C
B12A
WP73
NEEM Camp
B13
B14
Outbound to Summit
B15
Return to Thule
SUMMIT
B11E
B11D
B11C
B11
B9
B7
B4

Thanks !

Photo by: Robin Davies