LC-130 Capabilities

Overview

- Mission Overview
- Ground Ops
  - Polar Landing Zones (PLZ)
  - Assisted Takeoff (ATO)
  - Polar Cargo Handling
  - Remote Refuel
  - Maintenance Recovery Team (MRT)
- Flight Ops
  - IMC Procedures
  - Polar Airdrop (PAD)
  - SABIR ARM Projects
- SAR Capability
  - SAR Range (No Fuel Stop)
  - SAR Range (Fuel Stop)
  - SAR Range (Airdrop)
  - NVG Capability
- Mission Planning / Risk Mitigation
- New Data Analysis
  - SOLO Operations
  - LC-130 Ice Data

109 AW

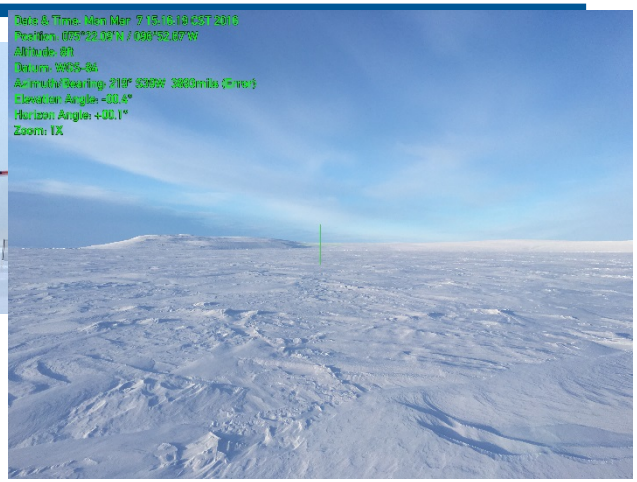
- 10 LC130 Aircraft
  - Only C130 variant equipped with skis capable of landing on snow covered landing zones.
- Logistical support to remote polar operating areas to include:
  - Cargo & Passenger Transport
  - Polar Airdrop
  - Remote Refuel / Defuel
- Typical Deployment Timelines:
  - Oct – Mar: Antarctica (ODF)
  - Apr – Aug: Arctic

Polar Landing Zones

- Wheeled LZ
  - Asphalt
  - Gravel
  - Ice

Polar Landing Zones

- Ski LZ
- Skiway/Landing Area
  - IFR/VFR
- Sea/Lake/Glacial Ice
- Open Snow



Assisted Takeoff (ATO)

- ATO Pros
  - Provides additional takeoff thrust
  - Increases aft CG
- ATO Cons
  - Increased weight
  - Increased fuel consumption
  - Limited availability
- NP2000 Props

Polar Cargo Handling

- Offloading Pallets
  - Forks/Sleds
  - Ski Combat Offload

- Loading Pallets
  - Forks/Sleds
  - Winching
  - Snow Bridge

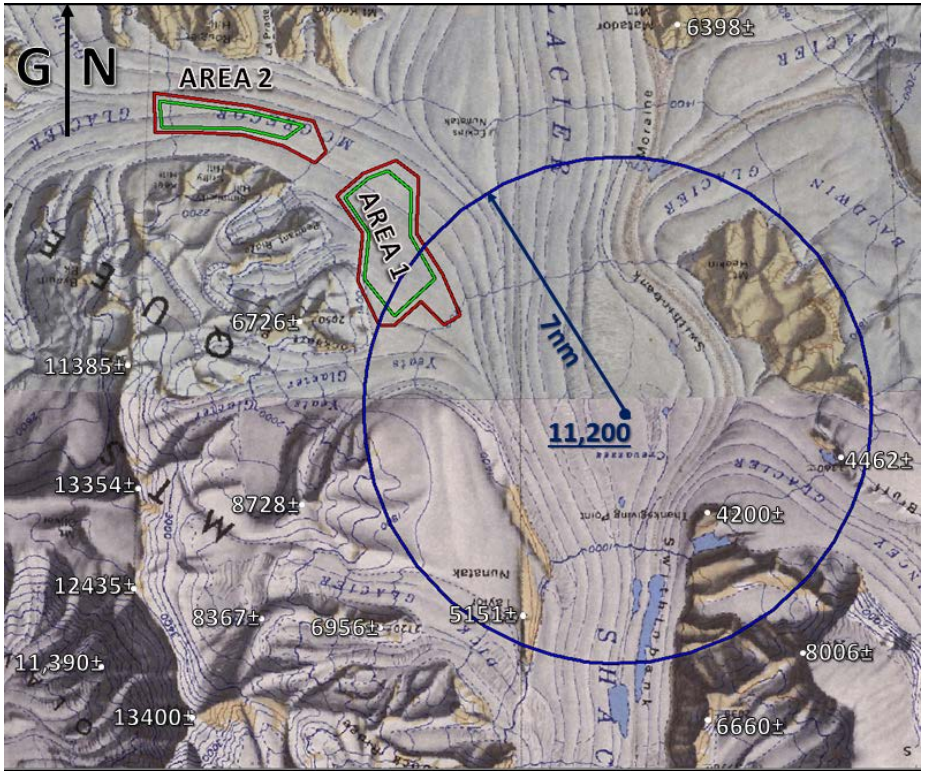
Remote Refuel / Defuel

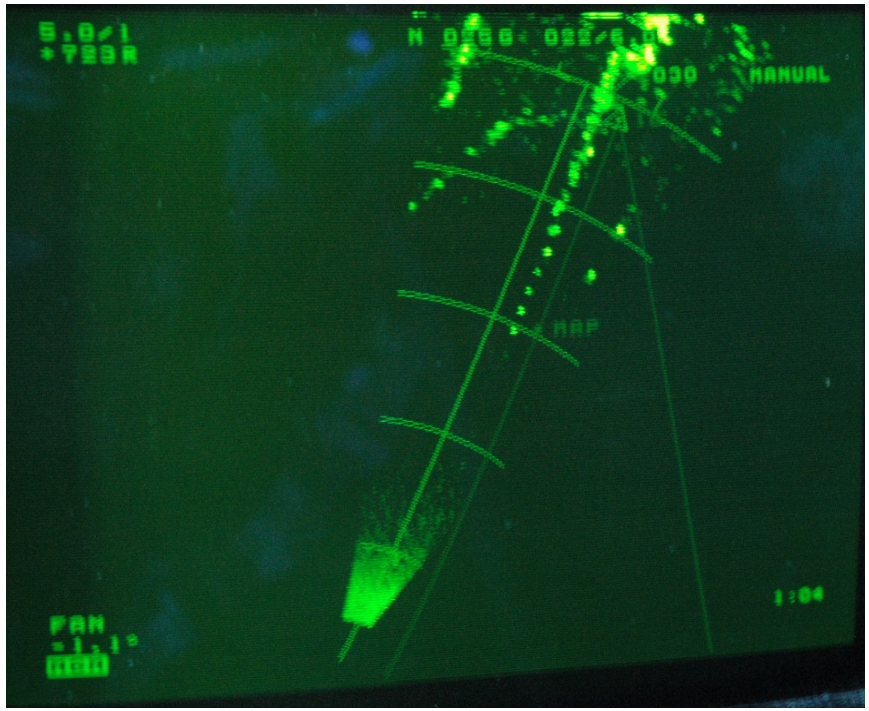
- Remote Refuel
  - Fuel Drums
  - Bladder
  - Aircraft to Aircraft

Maintenance Recovery

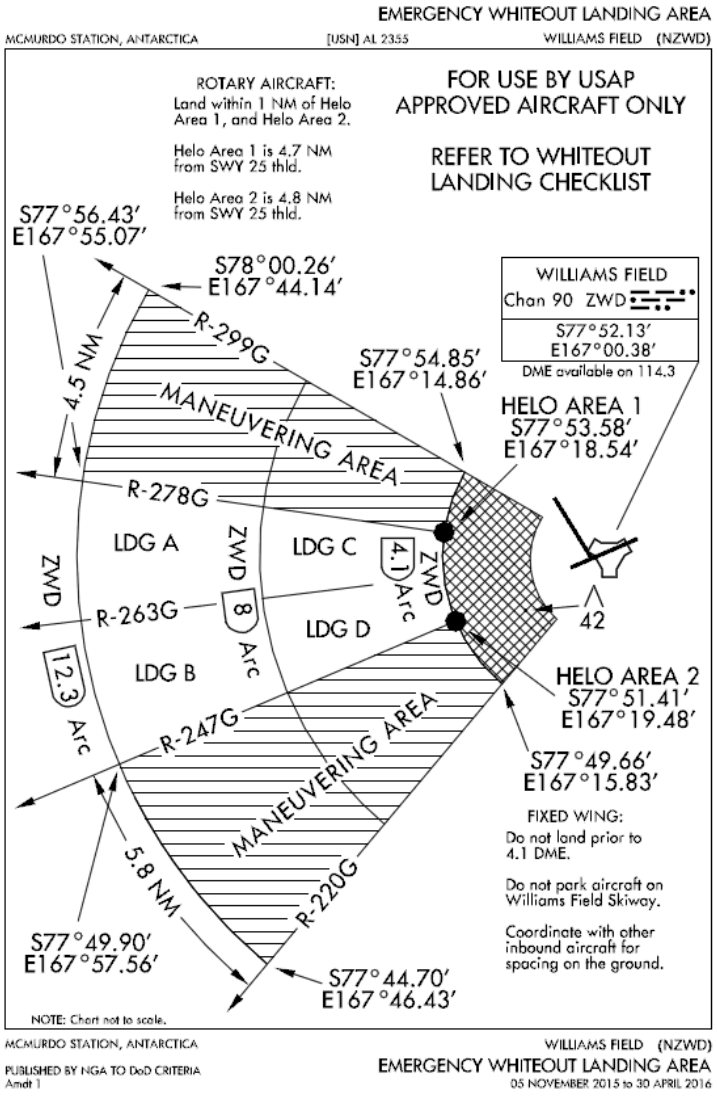
Flight Ops / IMC Procedures

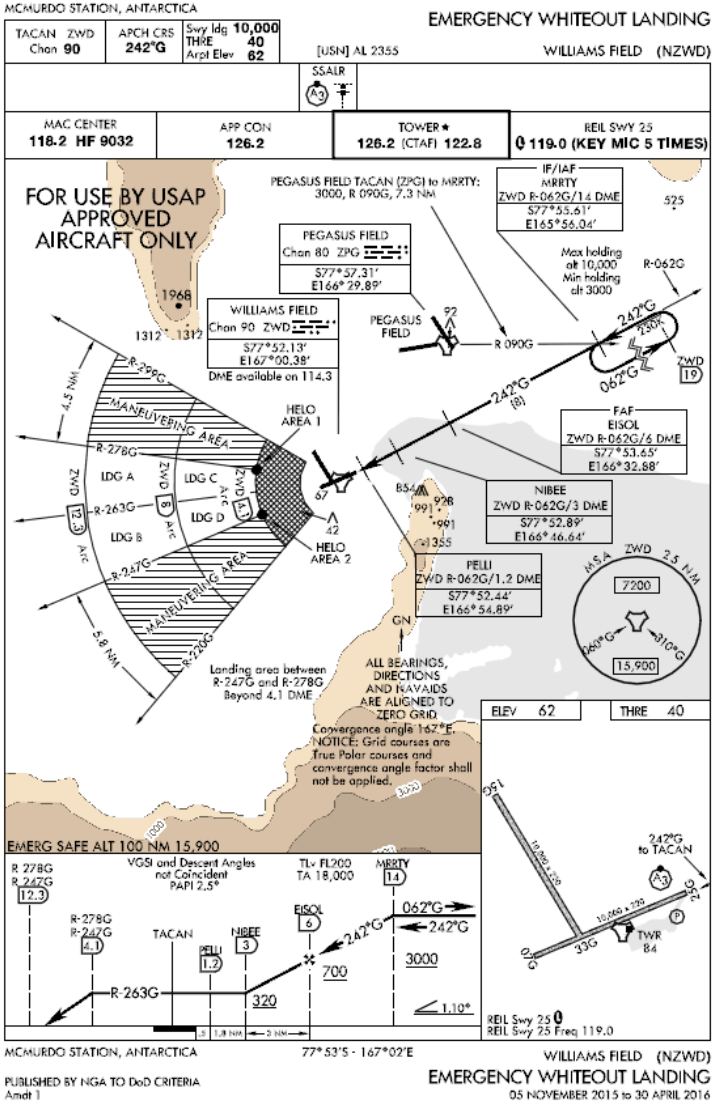
- Airborne Radar Approaches
- Restricted Operating Zone
- PAU





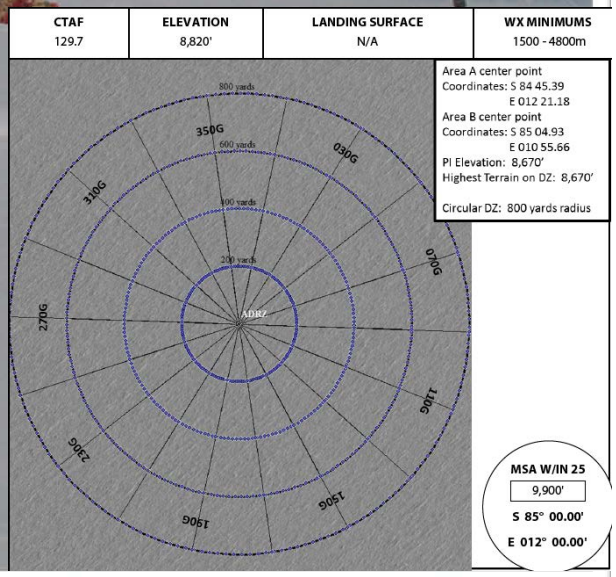
IMC Procedures / Whiteout



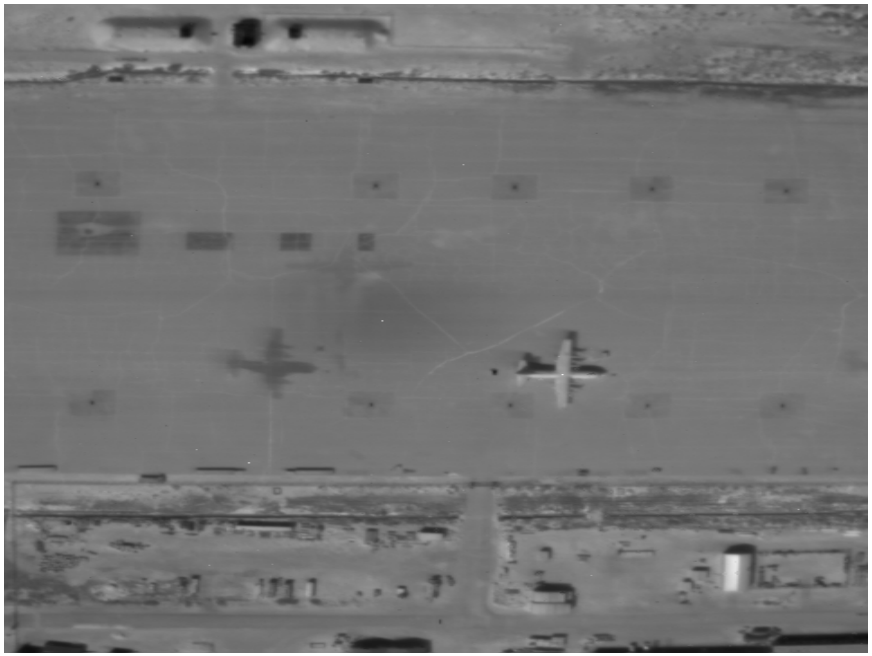


Polar Airdrop

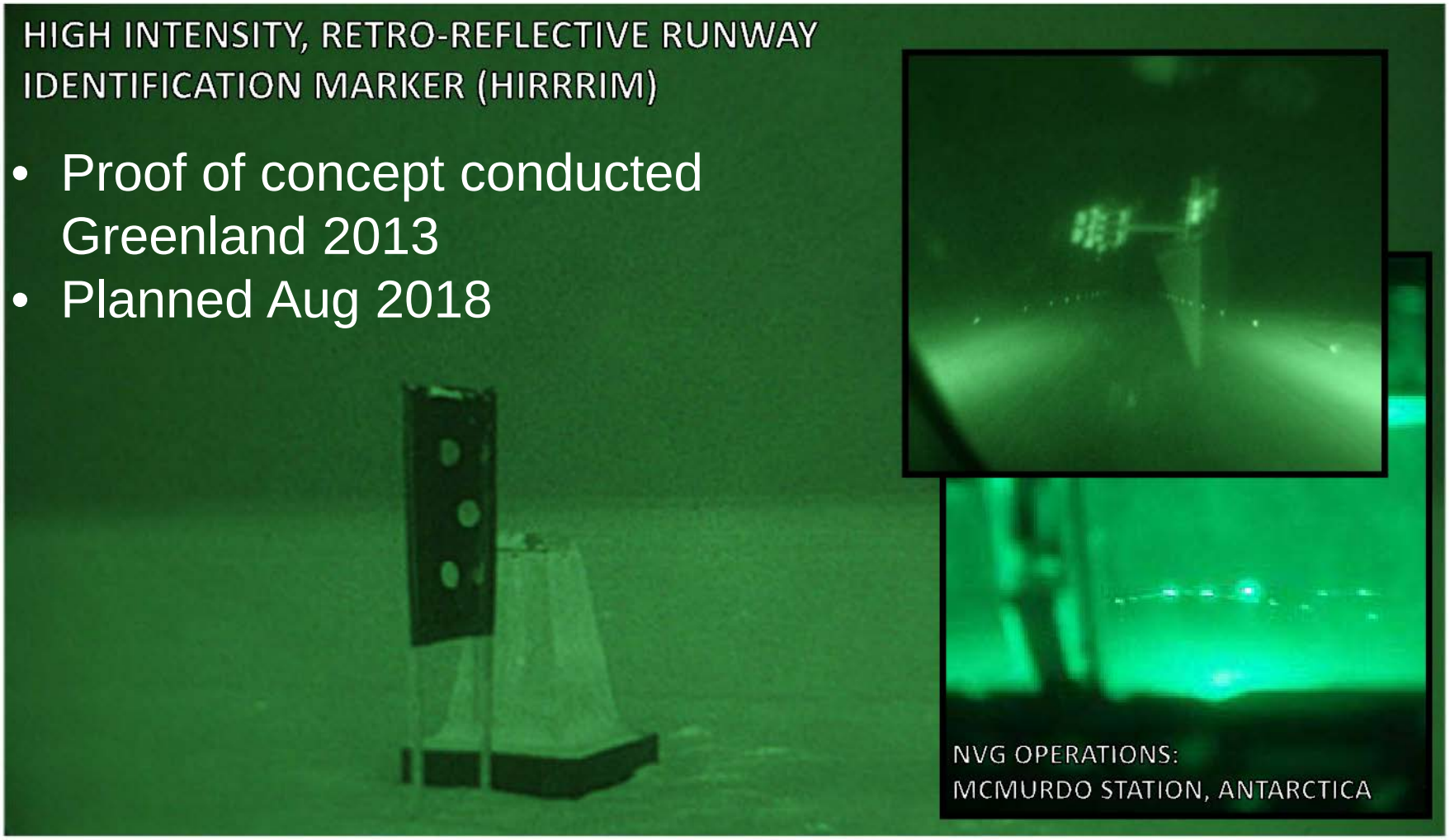
- No Ground Support Required
- HVCDS (max 14 bundles)
- Limitations
  - Shortage of Riggers
  - Bundles may be buried and/or highly dispersed



SABIR



NVG SKI OPS



- Proof of concept conducted Greenland 2013
- Planned Aug 2018

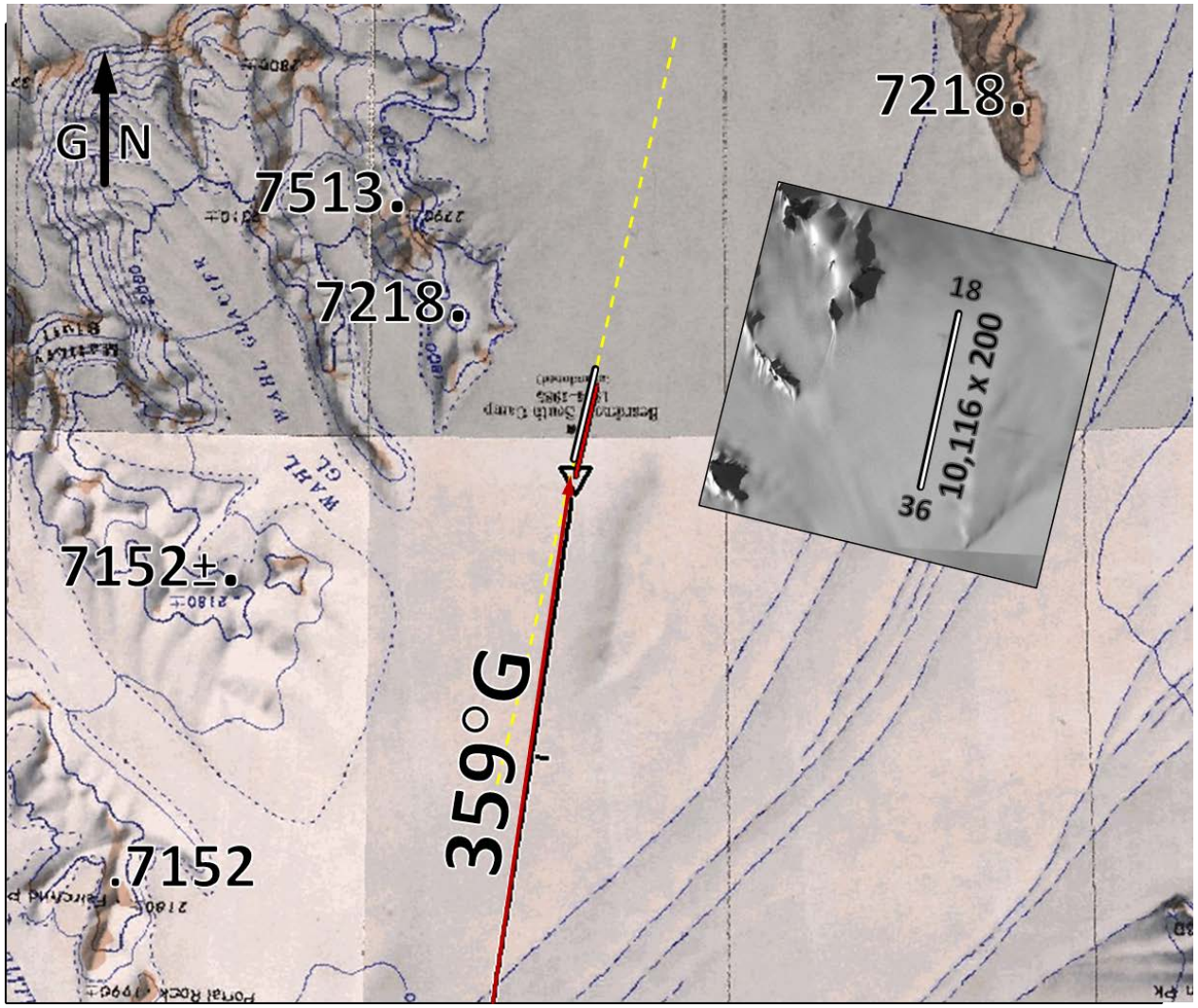
Mission Planning / Risk Mitigation

Photo courtesy of Graeme Howden, Engineer for New Zealand Air

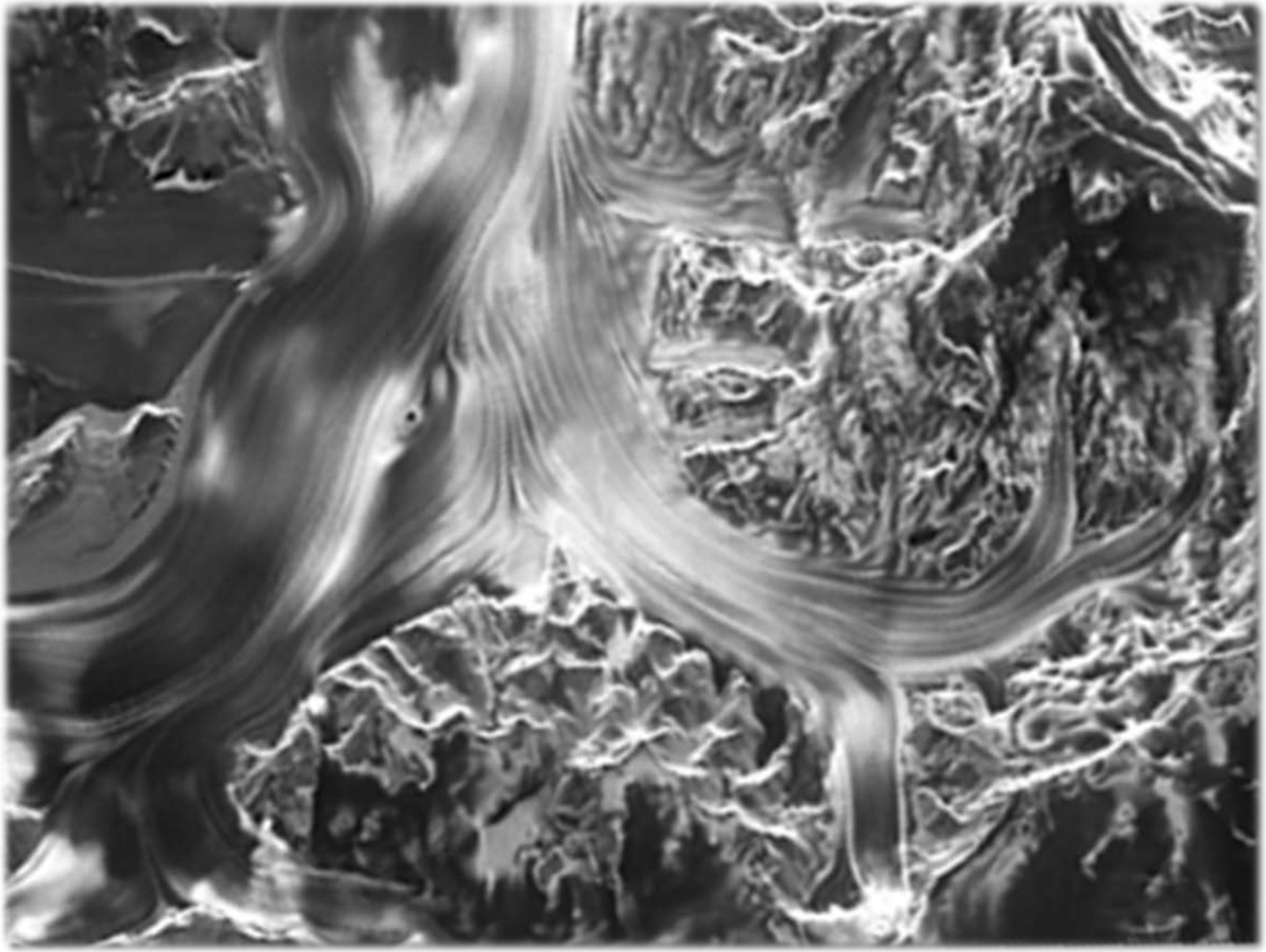
Mission Planning Factors

- Terrain Analysis
- Elevation
- Temperature
- Snow Conditions
- Crew Day
- Winds
- Visibility
- Cloud layers

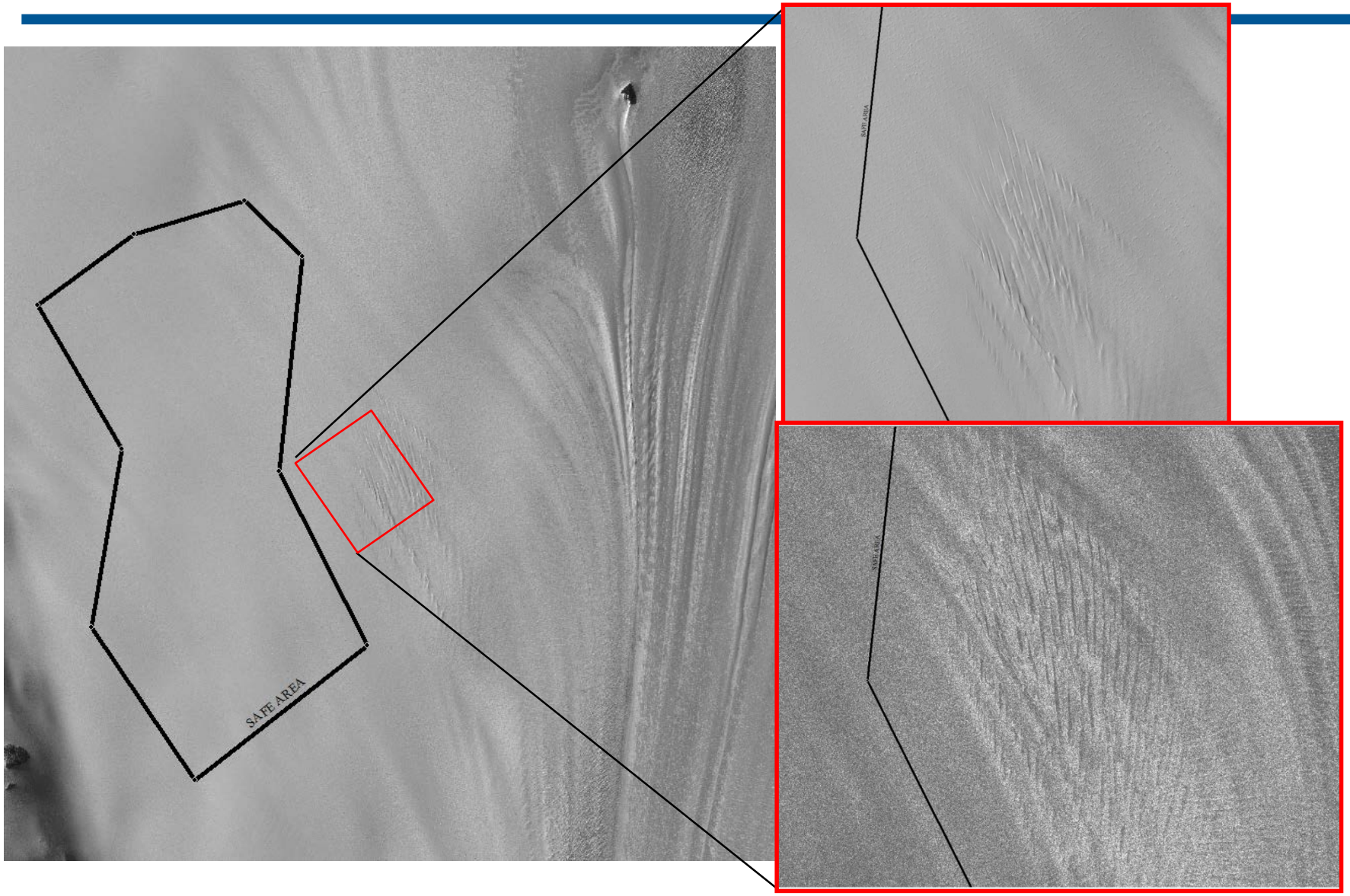
Terrain Analysis



Reliance on Remote Sensing

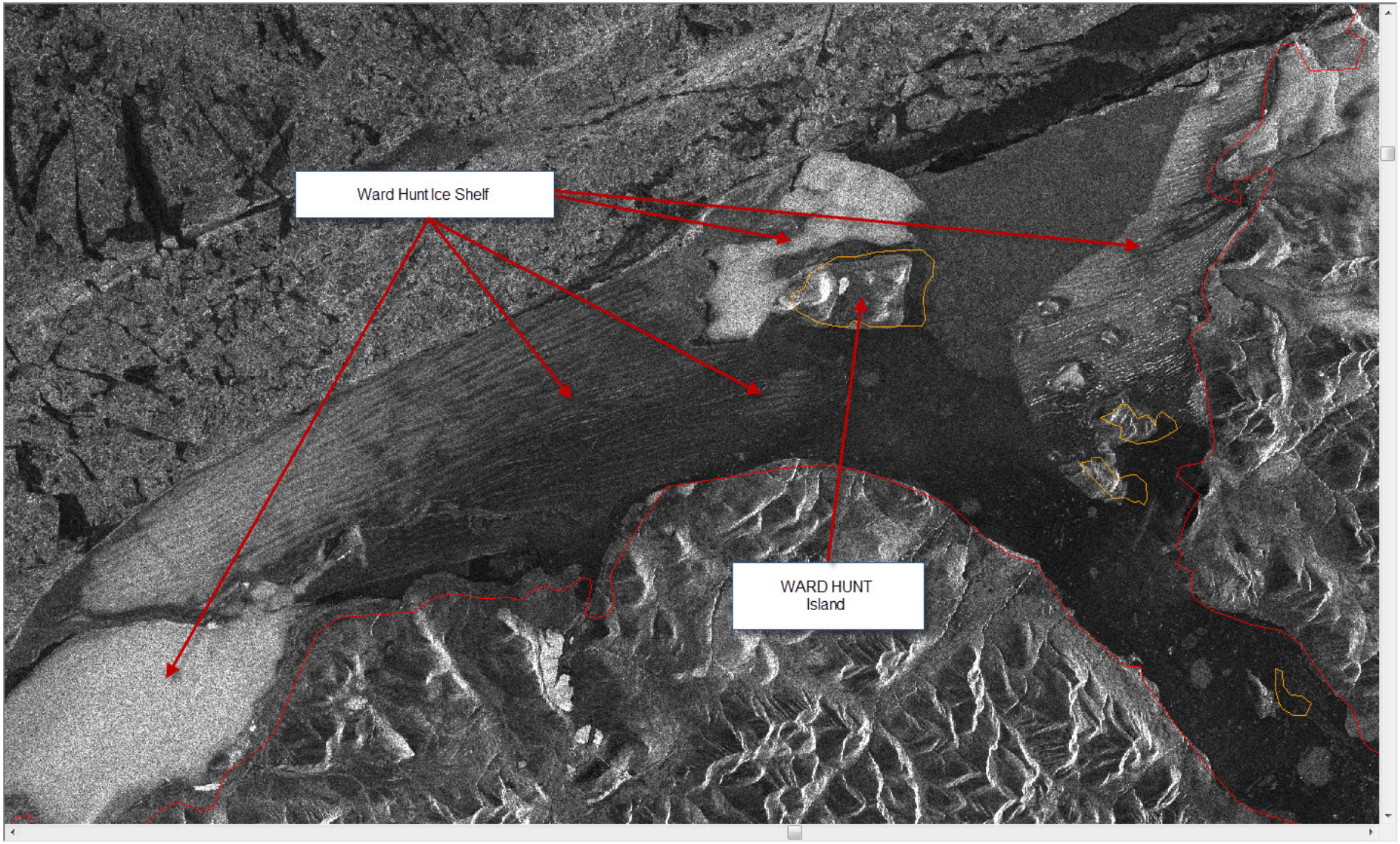


EO / SAR Imagery Analysis

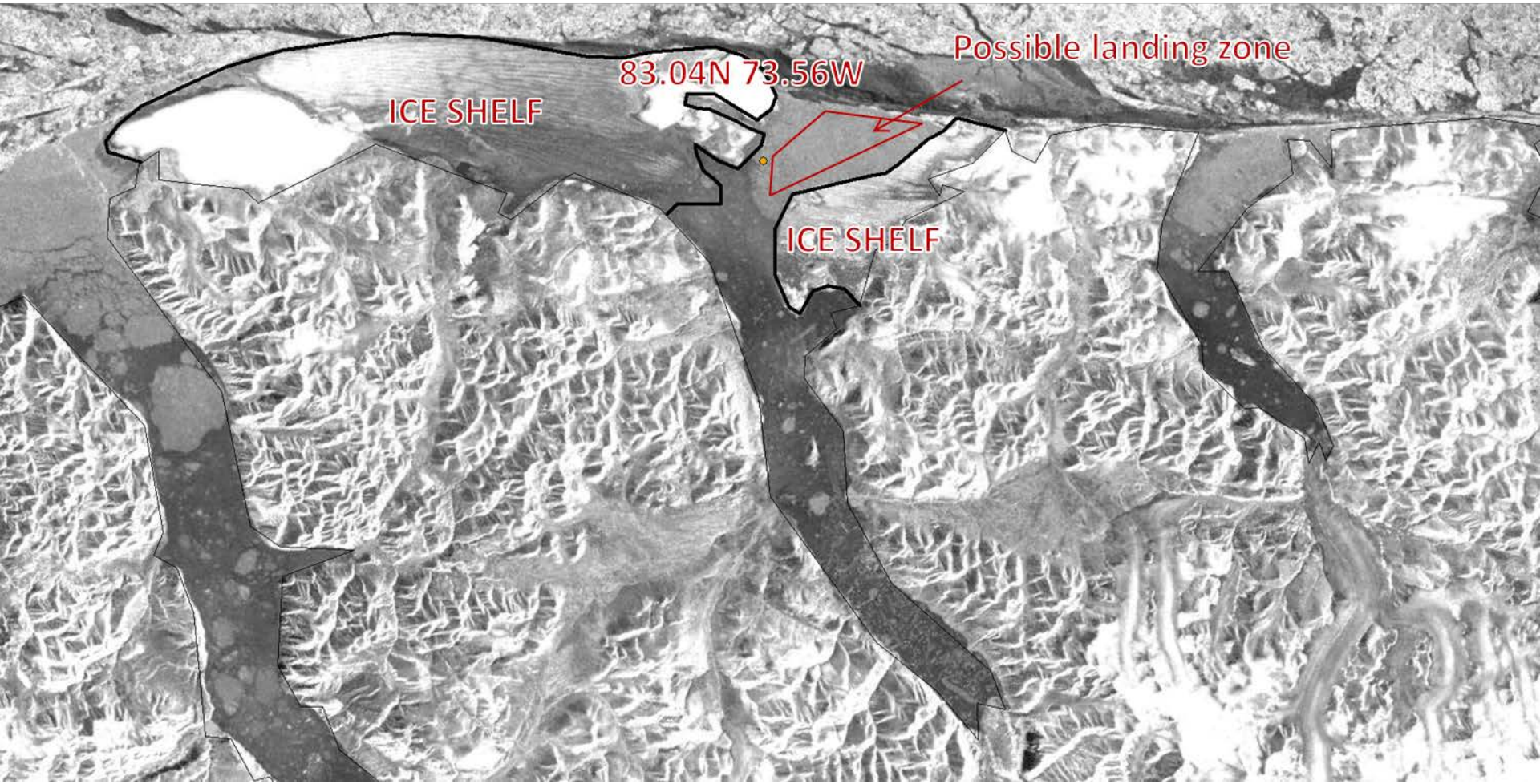


Ground Team Evaluation

Ward Hunt Island

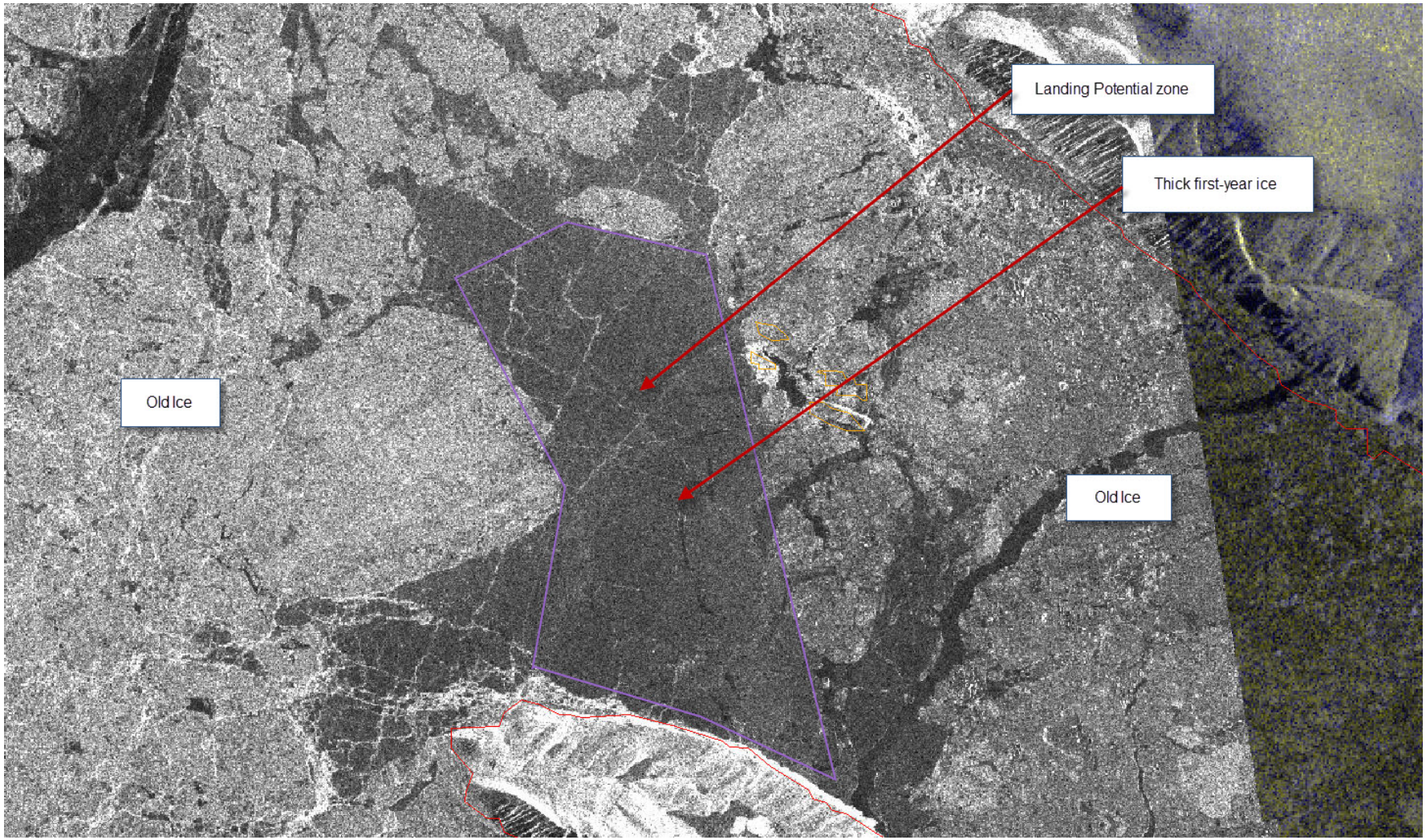


Ward Hunt Island



Ward Hunt Island

Sherard Osburn Fjord



Sherard Osburn Fjord

Ski Over Land Operations

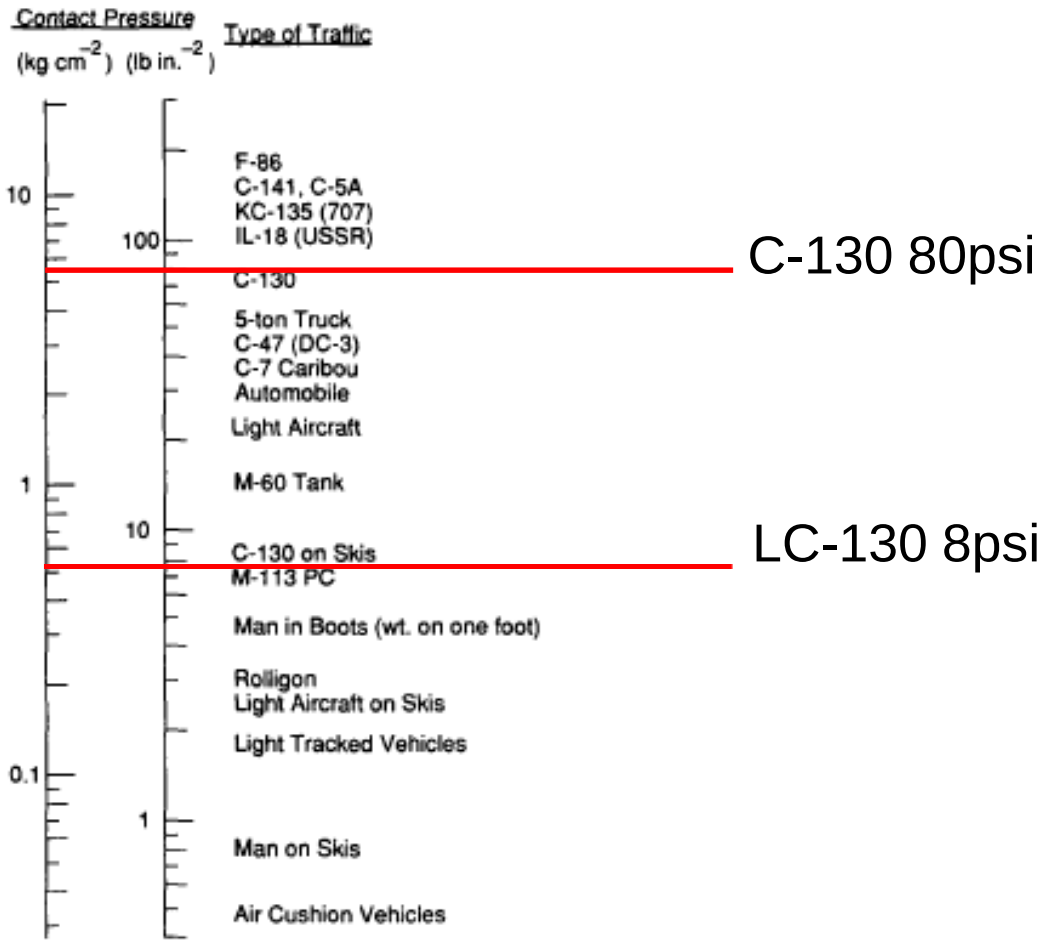
- Ski Over Land Operations (SOLO)
  - Currently LC-130 ski operations are restricted to Ice Cap and Snow over Ice operations
  - Development of SOLO is critical to expanding area of operations
  - Successful study of ability for Ski Operations over land would allow for a significant expansion of LC-130 operations in the Arctic theater

Ice Thickness Data

- Current ice thickness models are insufficient
  - Current LC-130 limitations are based on wheeled aircraft at maximum operating weights
  - Current limits do not address Ski Loading PSI's
  - A comprehensive study is needed to obtain accurate thickness numbers that will apply to the LC-130
  - Re-examination of existing source data may allow changes without new testing
  - Current Operational References: AFI 13-217, CFACM 10-100, CRREL 90-3, and US Naval Civil Engineering Command R860

Ice Thickness

- CRREL Monograph 90-3



Ice Thickness

TWIN OTTER - WHEELS * REGULAR OPERATION

Assumed Gross Weight (lb)	Req'd Minimum Ice Thickness Fresh Water Ice (in) for Average Daily Temperature			Req'd Minimum Ice Thickness Sea Ice (in) for Average Daily Temperature		
	14°F	22°F	31°F	10°F	19°F	28°F
8000	9	10	11 3/4	16¼	18¼	21¼
9000	9¼	10 3/4	12¾	17¼	19¼	22 3/4
10000	10	11¼	13¼	18	20¼	23 3/4
11000	10¼	11 3/4	13 3/4	18 3/4	21	24¼
12000	11	12¼	14¼	19¼	21 3/4	25¼
13000	11¼	13	15	20¼	22¼	26¼
14000	11 3/4	13¼	15¼	20 3/4	23	27

* To be used in conjunction with paras 24 and 27 to 50 of CFACM 60 - 1409

Twin Otter data exists for both wheels and skis

TWIN OTTER - SKIS * REGULAR OPERATION

Assumed Gross Weight (lb)	Req'd Minimum Ice Thickness Fresh Water Ice (in) for Average Daily Temperature			Req'd Minimum Ice Thickness Sea Ice (in) for Average Daily Temperature		
	14°F	22°F	31°F	10°F	19°F	28°F
8000	8¼	9¼	11	15¼	17¼	20¼
9000	8¾	10	11¼	16¼	18¼	21¼
10000	9¼	10¼	12¼	17	19	22¼
11000	9¾	11	12¾	17¾	19¾	23
12000	10¼	11¼	13¼	18¼	20¼	24
13000	10¾	12	14	19	21	24¾
14000	11	12¼	14¼	19¼	21¾	25¼

* To be used in conjunction with paras 24 and 27 to 50 of CFACM 60-1409

Ice Thickness

TABLE 8

HERCULES - WHEELS #

EMERGENCY OPERATION

Assumed Gross Weight (lb)	Req'd Minimum Ice Thickness Fresh Water Ice (in) for Average Daily Temperature			Req'd Minimum Ice Thickness Sea Ice (in) Average Daily Temperature		
	14°F	22°F	31°F	10°F	19°F	28°F
95000	21¾	25¼	28¾	33¼	37¼	45
105000	23	26¼	30	34¾	39	46¾
115000	24	27¾	31¾	36	40¼	48¼
125000	25	28¾	32¾	37¼	41¾	50¼
135000	26	30	34¼	38¼	43¼	51¾
145000	27	31	35¼	39¼	44¼	53¼
155000	27¾	32¼	36¼	40¼	45¾	54¾
165000	28¾	33¼	37¾	41¼	46¾	56¼
175000	29¼	34¼	38¾	42¾	48	57¼

C130 data exists for wheels only

Questions