



**The Race to the South Pole:
Ten Lessons for Project Managers**

presented to



Boston SPIN
February 15, 2010

by
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In Problem-Solving Organizations
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A note on format

- Underlined items are live links to:
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Please let me know as we go along
if you want to ask a question

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Core message

- Reaching the South Pole was a high-risk project
- Two teams tried it
 - Scott's approach relied on conventional wisdom
 - Amundsen's approach emphasized risk management
- Many projects today opt for conventional wisdom over a focus on risk
- The larger and riskier the project, the more important is risk management

The value of conventional wisdom declines faster as we move beyond the bounds of past experience

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**Background:
Geography**

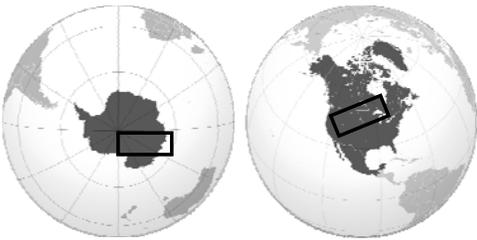


Amundsen-Scott South Pole Station

- South Pole is on a high plateau
 - Elevation: 9,300 feet
 - Desert: rarely snows
 - Equivalent pressure elevation: 10,800-13,120 feet
 - Summer high temperatures: -25°C (-12°F)
- Only one sunrise and one sunset per year
- Site of [Amundsen-Scott South Pole Station \(webcam\)](#)
- Time zone is that of [Christchurch, New Zealand](#)
- 700 miles from [Ross Ice Shelf boundary](#)
- Round trip: about 1400 miles

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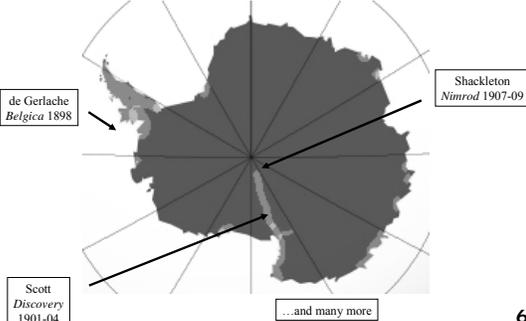
**Background:
The scale of things**



Roughly the distance from Las Vegas to Portland

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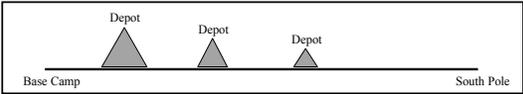
**Background:
State of Antarctic exploration, 1910**



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Background:
Expedition strategy

- Travel by ship to Ross Ice Shelf boundary
- Land all supplies and build base camp
- Preposition supplies at a series of depots
- Winter over
- Mount assault
- Return



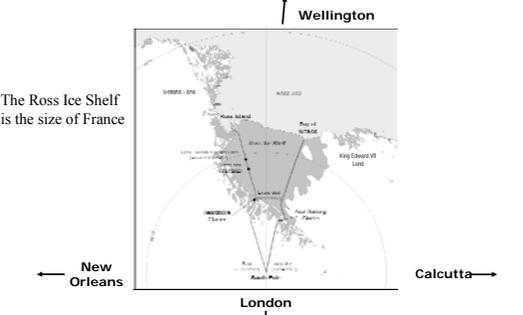
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Background:
The two expeditions compared

	Scott	Amundsen
Depart	15 Jun 1910	09 Aug 1910
Arrive base	04 Jan 1911	14 Jan 1911
Complement	65 men, 19 ponies, 33 dogs	20 men, 97 dogs
Winter over	33 men, 17 ponies, 33 dogs	9 men, 93 dogs
Depart for pole	01 Nov 1911	19 Oct 1911
Departure party	20 men, 2 motor sledges, 10 sledges, 16 dogs (estimate)	5 men, 4 sledges, 52 dogs
Pole party	5 men, 1 sledge	5 men, 3 sledges, 16 dogs
Arrive pole	16 Jan 1912	14 Dec 1911
Return to base	N/A	25 Jan 1912

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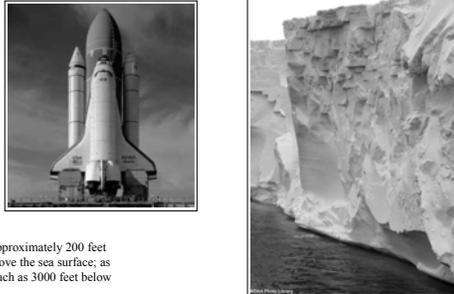
Background:
Two routes to the pole



The Ross Ice Shelf is the size of France

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Background:
The Ross Ice Shelf



Approximately 200 feet above the sea surface; as much as 3000 feet below

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Background:
Norwegian school of polar exploration

- First enunciated by Ludvig Schmelck
- Front page of Christiania newspaper late 1880s
- Previous expeditions had:
 - Large number of heterogeneous elements
 - Clumsy and expensive organization
- Proposed a “new method” of polar exploration
 - Limited number of participants
 - High state of physical readiness and training
 - All keep pace with each other
- Today we call this approach *agile development*
- The military analog is *maneuver warfare*

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The menu

- **Leadership:** matters most when trouble looms
- **Planning:** the foundation—it never really ends
 - ➔ **Scope creep:** avoidance requires constant vigilance
 - ➔ **Risk management:** prepare, but expect surprises
- **Improvisation:** a useful skill, but don’t rely on it
- **Discipline:** self-discipline and self-control must be controlled
- **Organizational politics:** imposes tight constraints
- **Team dynamics:** create multiple overlapping skill sets
 - ➔ **Technology management:** innovate with familiar technology
 - ➔ **Simplicity rules**

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Scope creep:
Avoidance requires constant vigilance

- Scope creep has multiple causes:
 - The unknown
 - Perfectionism
 - Placating conflict
 - Acquisition
 - Career advancement
 - Lies and self-deception
 - Union of all misunderstandings
 - Donald Crowhurst Effect
- Understanding how these processes work does help

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Scope creep:
British expedition's divided goals

- Evidence for glory and ambition
 - Scott's naval career blocked (*Albemarle* rammed *Commonwealth* Feb 1907)
 - Clements Markham seeks national glory
 - After Shackleton, Royal Navy less obstructionist
- Evidence for technology advancement
 - Scott advocates mechanized sledges
 - Convinces Skelton to make a prototype
- Evidence for Scott's pole-seeking

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Scope creep:
How Amundsen managed it

- One single goal: to reach the pole (and return)
- "I have decided to throw everything else aside"
- Highest priorities during the winter-over
 - Equipment upgrades
 - Planning
 - Training
 - Sleeping
 - Eating
- Limited meteorological observations
 - Readings taken outside working hours
 - Never at night

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Scope creep:
Sub-Lt. E. R. G. R. "Teddy" Evans, RN

- Planned expedition to explore King Edward VII Land
 - Had funding
 - Discloses plan to Sir Clements Markham May 1909
 - Markham tells Scott
 - Scott incorporates it into his expedition
 - Markham suggests Evans join Scott July 1909
 - Scott offers Evans second-in-command
- Classic example of scope creep by acquisition



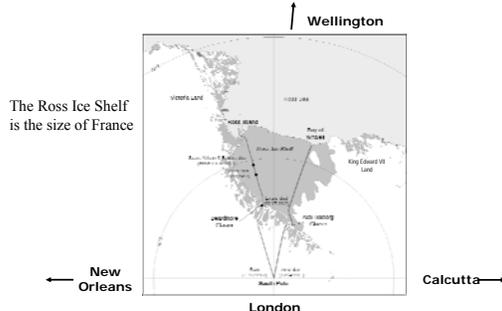
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Risk management:
Prepare, but expect surprises

- Emphasize risk according to the unknowns
- Understand "risk management risk"
 - Organizational blind spots
 - Risk dynamics
 - Risk interactions
 - Political interference in risk management

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Risk management:
Two routes to the pole



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Risk management:
Risk comparison for the two routes

- Amundsen's path had more unknowns
 - Ice conditions
 - Pass through the mountains
 - Resource consumption
- Terrain knowledge helps when choosing equipment
- Amundsen's effort more like a project
- Scott's effort more like operations
- Amundsen much more focused on risk
- Risk management risk is rarely recognized

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Risk management:
Not knowing where you are

- Unexpected depletion of resources
 - Budget
 - Schedule
- Missing an availability window for a resource
- Not understanding what the goal really is
- Not knowing when you're finished
 - You believe you're finished but you're mistaken
 - You believe there's work left to do but there isn't

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Risk management:
Organizational blind spots

- We can plan only for the risks we can anticipate
- Organizations can be blind to some risk classes
- Comparing Scott and Amundsen:
 - Scott didn't understand scurvy, polar travel, polar clothing
 - Amundsen prepared by studying methods of polar natives

Reduce organizational blind spots
by gathering external intelligence

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Risk management:
Risks of navigational errors

- Missing a depot
 - Losing time while trying to locate the depot
 - Unable to retrieve depoted equipment
 - Running out of food
- Off course
 - Longer trip than necessary
 - Unable to find the pass through the mountains
 - Running out of food
- Steering for a point that isn't the pole
- Unable to prove that you got to the pole

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Risk management:
Amundsen and navigational risk

- Snow cairns at three-mile intervals, 1 per hour
 - Two meters high, one visible from the next
 - Each contains record of position, distance to last depot, bearing to previous cairn
- Depots flagged east and west
 - Five miles, every half mile
 - Each pennant numbered, with distance and bearing to depot
- On return, searched for dog spoor to locate outbound trail

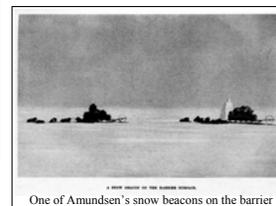
Amundsen's risk mitigation tactics were either
non-interacting or weakly interacting

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Risk management:
Amundsen's depots and beacons



Amundsen's 83' Depot



One of Amundsen's snow beacons on the barrier

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**Risk management:
Scott and navigational risk**

- Depots marked with a single pennant
- Cairns too low, badly made, too few for navigation
- No dog spoor marking trail (no dogs)
 - Had to unharness and scratch to find outbound trail
 - Old tracks drifted up
 - Old tracks hard to detect with sun ahead

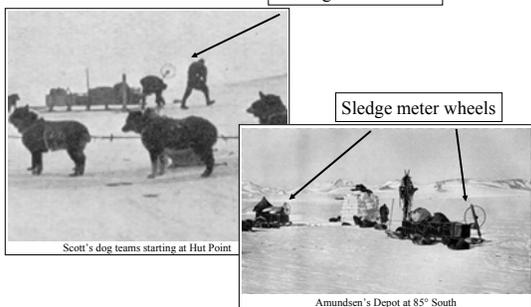
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**Technology management:
Be innovative with familiar technology**

- For high-risk projects, avoid untried technology
- Use whatever resources you can to master critical technologies
- Attend to the low-tech substrate
- When you innovate, innovate with the familiar technologies
- Beware of fads

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**Technology management:
The sledge meter**



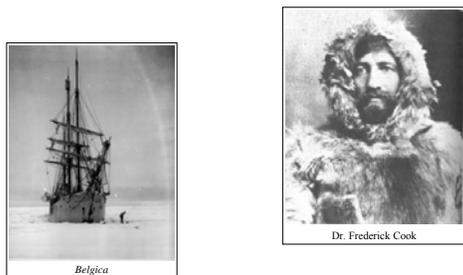
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**Technology management:
Significance of perfecting the sledge meter**

- Sledge meter measures distance traveled
 - Useful for reckoning position
 - Mitigates need to make actual sun sightings
 - Helps monitor pace
- Problem: drift snow gets into the gears
 - Drift snow particles are small
 - Cause sledge meter wheel to undercount distance
- Scott used commercial sledge meters
- Amundsen also had commercial models
 - Dissatisfied with performance on depot runs
 - Over winter, had them completely rebuilt

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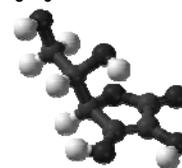
**Technology management:
Early progress on scurvy**



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**Technology management:
Ascorbic acid – C₆H₈O₆**

- Hydrogen
- Oxygen
- Carbon



Albert Szent-Györgyi
Nobel Prize
Physiology or Medicine, 1937
Photo 1948

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**Technology management:
The bilberry and cloudberry**



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Simplicity rules

- Seek component attribute compatibility
 - Homogeneity of project assets isn't always possible
 - When heterogeneity is necessary, seek compatibility
- Seek component synergy
 - Use assets that work well together
 - Use assets that serve each other
- Exploit situational momentum
 - Overcoming a situation requires:
 - Elaborate apparatus
 - Extensive effort
 - Exploit features of the situation to solve the problem

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**Simplicity rules:
Scott's team Man-hauling, on ski**



Scott, Wilson, Oates and Evans returning from Pole, 1911. Photographer: Bowers

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**Simplicity rules:
Scott's Siberian & Manchurian ponies**



Pony Camp on the Barrier

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**Simplicity rules:
Scott's Wolseley motor sledge**



270. A motor leaving the winter "garage". Oct. 1911.

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**Simplicity rules:
Seek attribute compatibility**

Speeds of transport modes (1910):

Mode	S	A	mph	Comments
Man walking	•		3	Packed snow
Horse walking	•		3-4	Packed snow
Sled dogs	•	•	6-7	Poor conditions
Cross-country ski	•	•	10	Estimate; modern skier can sustain 14 mph
Motor sledge	•		4.5	Pulling a 3-ton load

In any one phase of a project, the most dysfunctional task team limits the overall performance of the project team

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**Simplicity rules:
Seek attribute compatibility**

Pressure of transport modes:

Mode	S	A	psi	Comments
Human foot	•		2.2	
Horse hoof	•		15.	
Dog paw	•	•	3.5	
Cross-country ski	•	•	0.5	
Motor sledge	•		4.5	estimated
Tucker Sno-Cat			0.6	

In any one phase of a project, the most dysfunctional task team limits the overall performance of the project team

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**Simplicity rules:
Exploiting situational momentum**

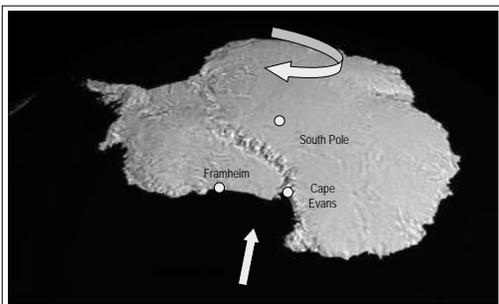
Exploiting situational momentum means:

Use the elements of the situation to your advantage rather than overcoming or defeating the situation

- Overcoming a situation requires:
 - Elaborate apparatus
 - Extensive effort
 - In organizations, political capital
- Exploiting features of the situation = finding a way to collaborate with it
- Examples:
 - Amundsen's night travel
 - Scott's night travel
 - Canine coprophagia

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**Simplicity rules:
Elements of solar geometry**



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**Simplicity rules:
Scott's travel schedule**

- On the trip South, travel by "day"
 - Start of day's march: sun to their left
 - Noon: sun behind
 - End of day's march: sun to their right
- On the return trip North, travel by "day" also
 - Start of day's march: sun to their right
 - Noon: sun ahead
 - End of day's march: sun to their left
- Disadvantages on return North
 - More difficult to see southbound trail, cairns, pennants
 - Greater risk of snow blindness

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**Simplicity rules:
Amundsen's travel schedule**

- On the trip South, travel by "day"
 - Start of day's march: sun to their left
 - Noon: sun behind
 - End of day's march: sun to their right
- On the return trip North, travel by "night"
 - Start of night's march: sun to their left
 - Midnight: sun behind
 - End of night's march: sun to their right
- Advantages
 - Easier to see old southbound trail, cairns, pennants
 - Less risk of snow blindness

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**Simplicity rules:
Canine Coprophagia**

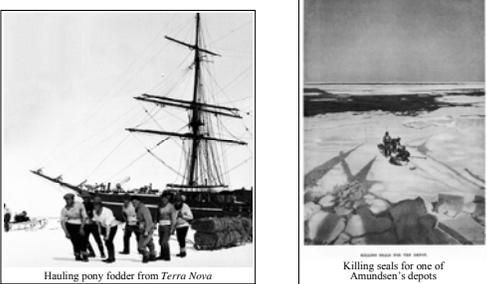
- Coprophagia: the consumption of feces, from the Greek:
 - κόπρος copros ("feces")
 - φαγῆν phagein ("to eat")
- Scott's and Amundsen's approach *in transit*
- Amundsen's approach in winter camp



Oskar Wisting and his dog team at the South Pole

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**Simplicity rules:
Beasts of burden**



Hauling pony fodder from *Terra Nova*

Killing seals for one of Amundsen's depots

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Resources

- Politics, meetings, communication and conflict
 - Articles at <http://ChacoCanyon.com/pointlookout/politics.shtml>
 - Tips booklet *303 Secrets of Workplace Politics* at <http://ChacoCanyon.com/products/secrets-politics.shtml>
- Articles at <http://ChacoCanyon.com/pointlookout/communication.shtml>
- Tips booklet *101 Tips for Communication in Emergencies* at <http://ChacoCanyon.com/products/techdivide.shtml>
- Tips booklet *101 Tips for Effective Meetings* at <http://ChacoCanyon.com/products/101tipsmeetings.shtml>
- Tips booklet *101 Tips for Managing Conflict* at <http://ChacoCanyon.com/products/101tipsconflict.shtml>

• Annotated, hyperlinked bibliography at <http://ChacoCanyon.com/pdfs/rtp-bibliography.pdf>

• More resources at <http://tinyurl.com/ylhazny>

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