Shifting Gears: From Transport Challenges to Solutions - Airships

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Northern Transportation

Challenges

- Infrastructure Gaps
  - Vast Distances
  - Seasonal Service
- High Freight Rates
  - Thin Markets
  - Few Backhauls
- Harsh Conditions
  - Climate Change
  - Permafrost

Solutions

- Ships
- Barges
- Trucks
- Airplanes
- Helicopters
- Airships

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Northern Transportation Solutions

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Problems with the Giant Zeppelins

- **Materials**
  - Gas containment
  - Structural failure
  - Envelope deterioration
- **Controllability**
  - Large ground crews
  - Engine failure
- **Safety**
  - Violent storms
  - Hydrogen gas/flammable envelope

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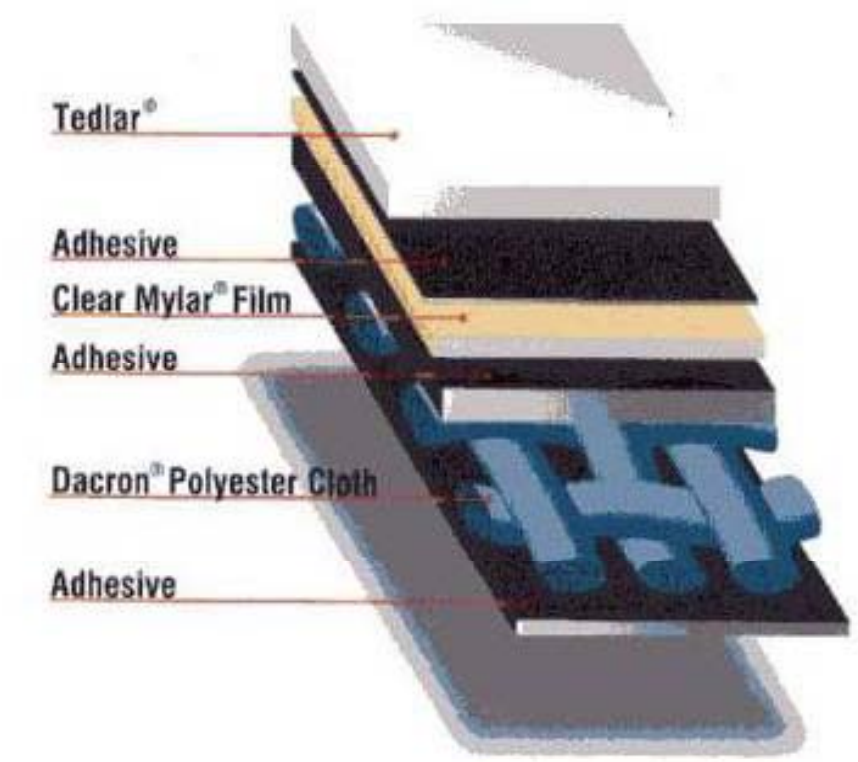
Key technological advances applied to Airships

- **Robustness:**
  - **Robust, lightweight envelope materials**
  - **Carbon fibre composites**
- **Control:**
  - **Vectoring engines**
  - **Modern avionics/hydraulics**
- **Safety:**
  - **Computer design tools**
  - **Nonflammable helium gas**
  - **Satellite weather information**



Tcom envelope material

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Airship Options

Hybrid Aircraft

Traditional Airships

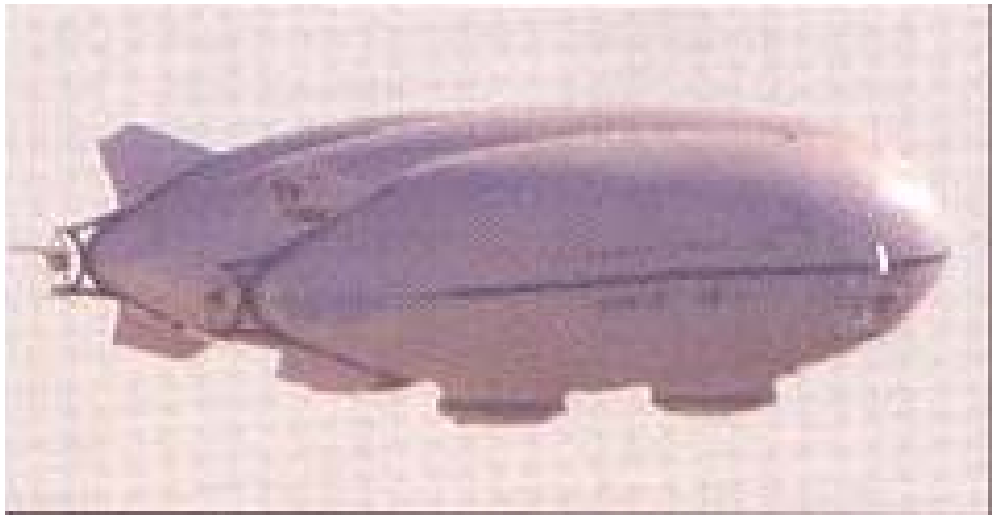
Spherical Airships

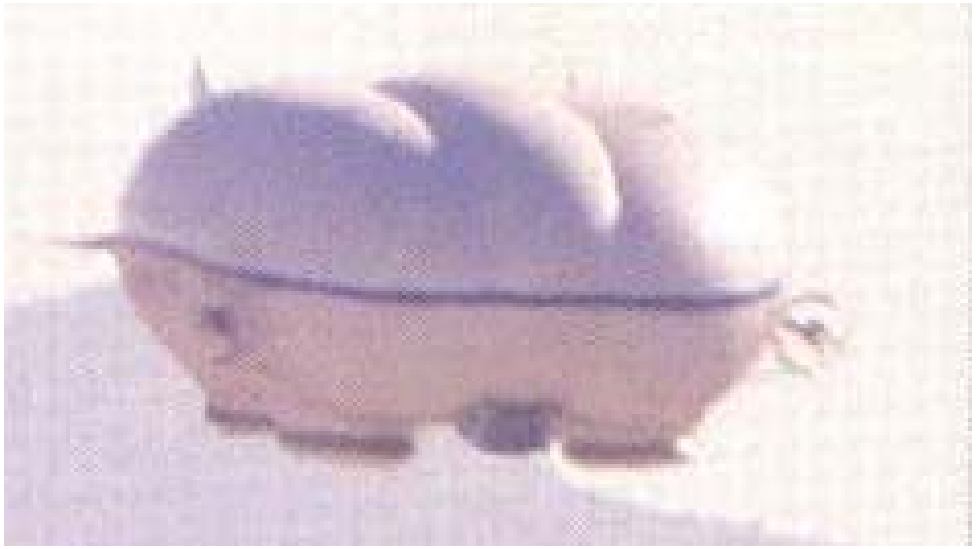
Status of Airship Developers

Location and Company	Aerostats	LTA Vehicles	Hybrid Vehicles
U.S.: Lockheed-Martin		design	prototype
TCOM	certified		
Millennium Airships			design
World Aeros	certified	prototype	design
Airship Mgt Services		certified	
American Blimp Co.		certified	
Ohio Airships			prototype
Germany: CargoLifter	testing		
Zeppelin		certified	
U.K./Italy: SkyCat		certified	model testing
Canada: 21st Century Airships		prototype	
Russia: RosAeroSystems	certified	prototype	
Japan: National Research		testing	
South Korea: National Research		testing	
China: Vantage Airship Co., Ltd.		certified	


ZEPPELIN NT
Foto: © Stanko Petek www.luftbild.com

Lockheed-Martin P-791 Hybrid Airship





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Anglo-Roman SkyCat

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Ohio Airships: DynaLifter

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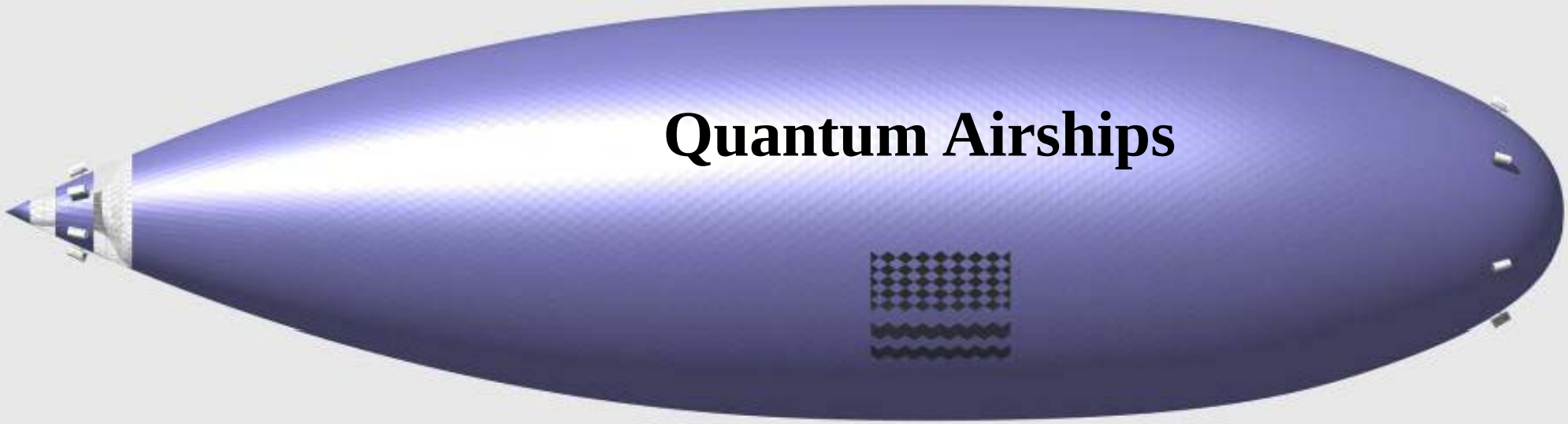

Quantum Airships

Transport Alternatives for the North

	Marine	Trucks	Airplane	Helicopter	Airships
Freight Cost	**Lowest**	**Medium**	**High**	**Very High**	**Medium**
Payload					
Seasonality					
Delivery Speed					
Infrastructure					
Maintenance					
Flexibility of access					
Climate change impact					

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Freight Cost	Lowest	Medium	High	Very High	Medium
Payload	**500-25,000 T**	**20-42 T**	**1-20 T**	**1-5 T**	**5-250 T**
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Climate change impact					

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Climate change impact	**Positive**	**Negative**	**Negative**	**None**	**None**

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Airships Make Sense for the North

Market Opportunity

1. **High margins**
2. **Minimal competition**
3. **Large potential market**

Service Characteristics

1. **Cost competitive with trucks**
2. **Flexibility of helicopters**
3. **Environmental impact of marine**
4. **Service level of airplanes**

The North Makes Sense for Airships

Missing Ingredient

- Business Confidence

Missing Ingredient

- Business Confidence

Solutions

- Education
- Demonstrations
- Competitions

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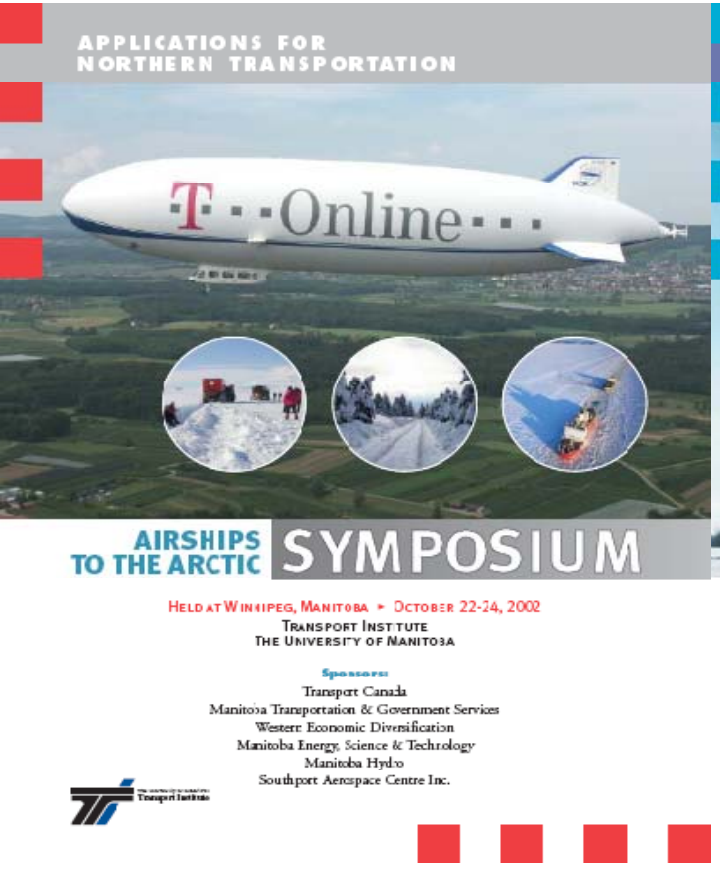
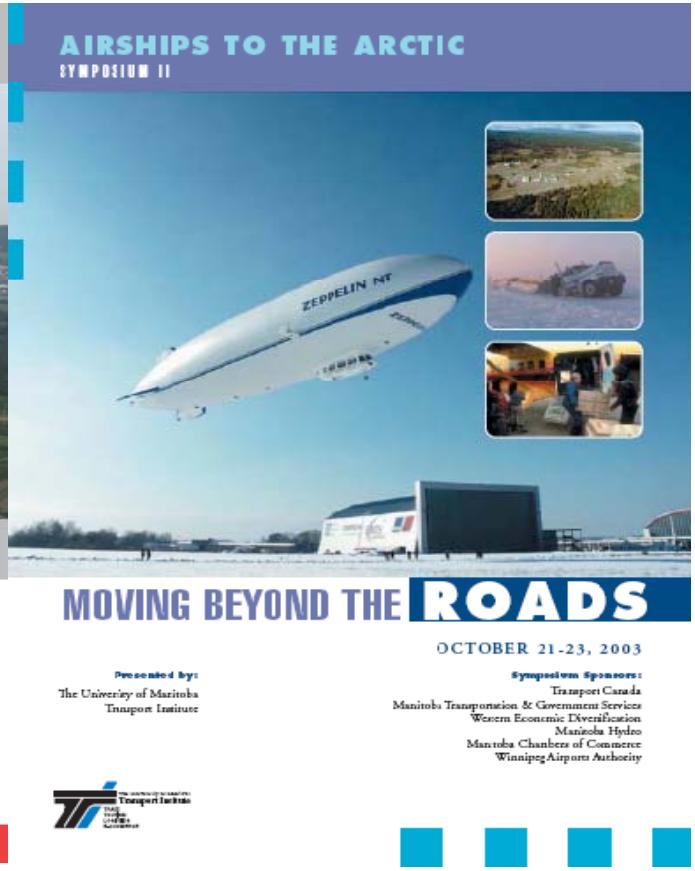
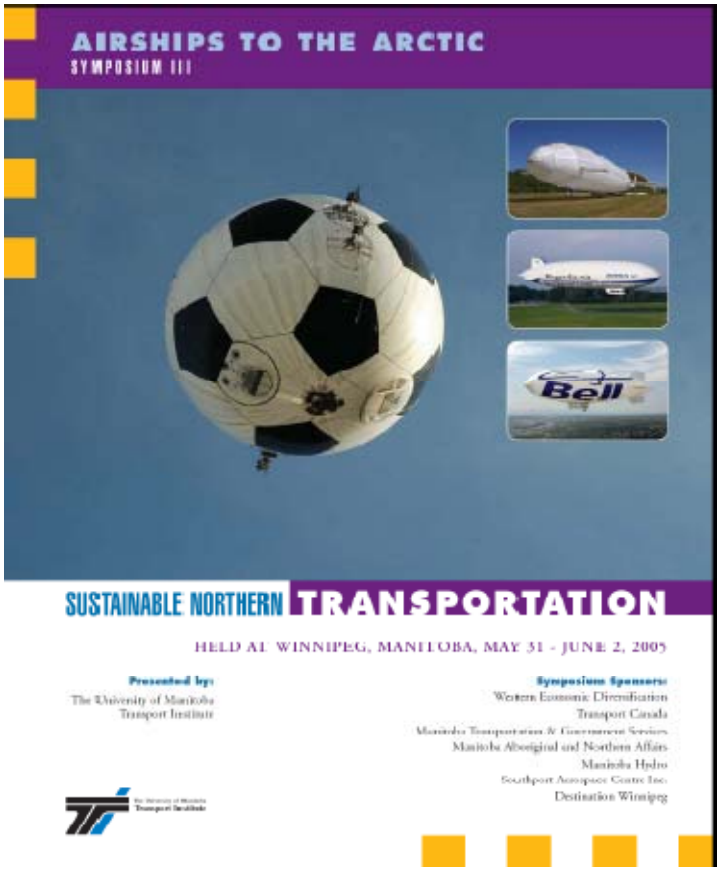
ISO Polar Airships

- Not-for-profit Research Institute
- Cold weather testing & certification
- Engineering, Economics & Market analysis
- Business case preparation development
- Demonstrations
- Airships to the Arctic Conferences
- Airship pilot training

Education







Airships to the Arctic IV Conference

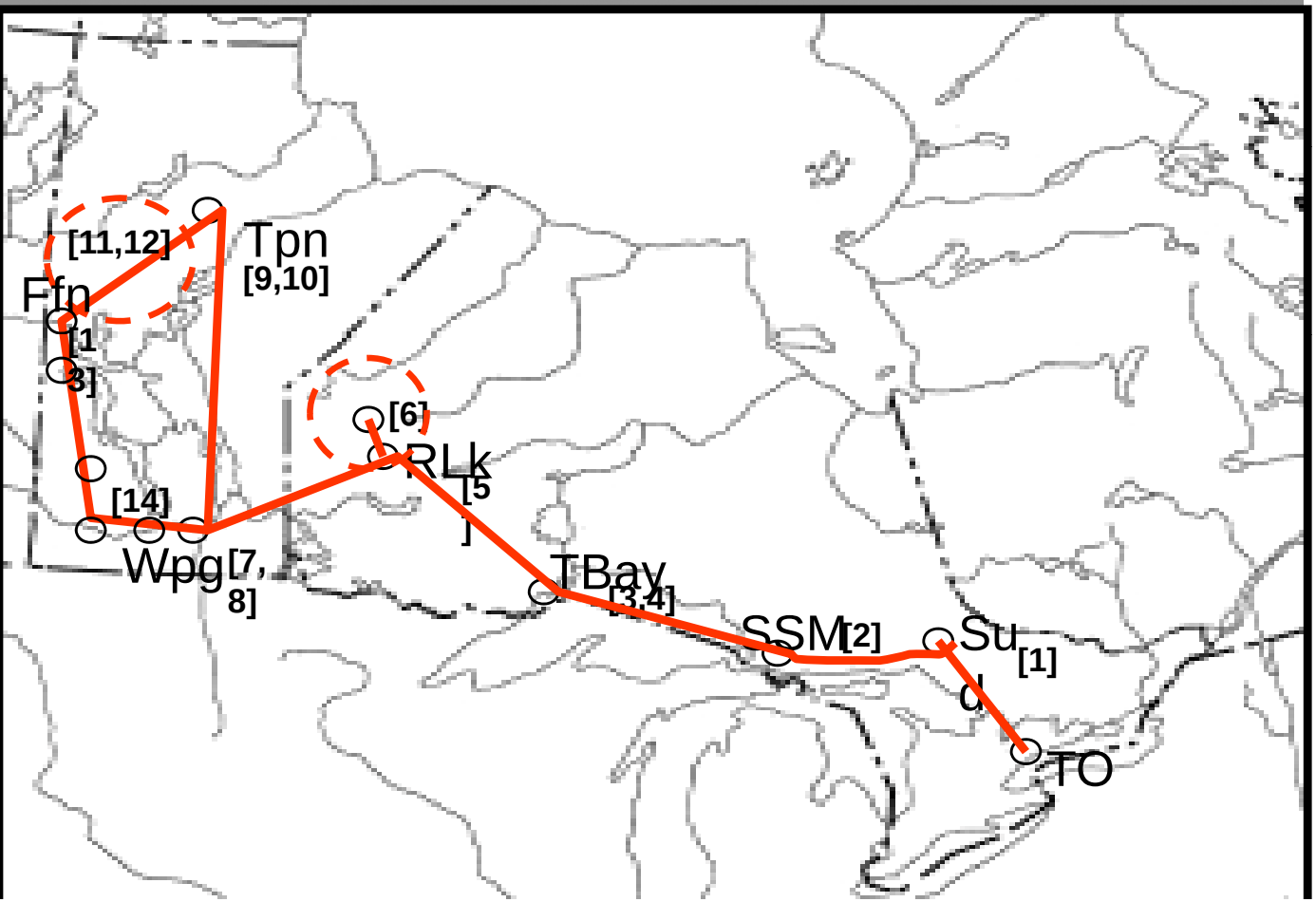
October 2007 at Winnipeg, Manitoba

Demonstration
July 2007

ISO Polar Airship

Firsts:

- cargo delivery to a remote community
- measurement of airship GHG emissions
- test for mineral exploration
- longest flight of a Canadian-built airship



Competition:
An X-prize For Transport Airships

Proposed Winning Criteria

Minimum payload	50 tonnes
Time to load and unload payload	1 hour or less
Round trip range	1,000 kilometers
Weather conditions	-40C operations
Greenhouse gas emissions	zero emissions
Average speed	100 kilometers per hour

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Concluding Remarks

- The transportation challenges of the North require a technological breakthrough
- The limits of existing approaches are well known
- New generation airships deserve a hard look
- No technological barriers remain
- The most important barrier is the lack of business confidence
- Everyone wants to be the “second one in”, but no one is calculating the cost of delay

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Concluding Thought

In the case of the airship,
the vehicle is the infrastructure

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