

# ECOMAGIC ENVELOPES

A real improvement in  
Hot Air Balloon flying



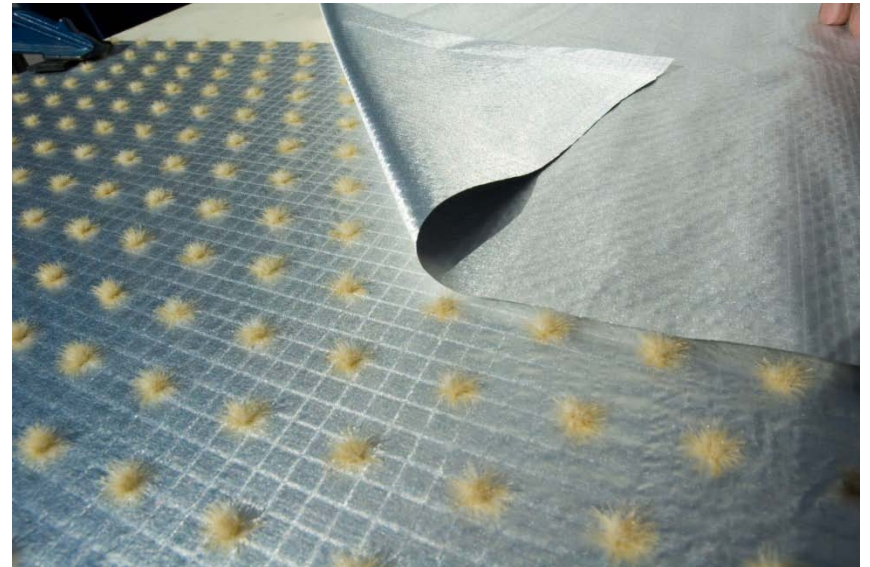
# INTRODUCTION

- ULTRAMAGIC as manufacturer always interested in improving .
  - Lower consumption
  - Lower emissions
  - Lower noise
  - Higher performances
- No major innovations in fabric since Ultralast/Hyperlast
- Opportunity to work with a top University
  - High qualified engineers interested in balloon development
  - Sophisticated instruments to have precise data.
- Development 3 years time and continues



# TECHNICAL BACKGROUND

- 3 Types of heat loss
  - Radiation (most important)
  - Conductivity (medium)
  - Convection (less)
- Double layer fabric targets
  - Low radiation
  - Low conductivity
  - Reasonable low weight
  - Foldable
  - Good mechanical characteristics



# CALCULATED DATA

- **Standard balloon**
  - Average consumption 600 W/m<sup>2</sup> with a 25 kg/100 m<sup>3</sup> load
  - A size 56 is a 1580 m<sup>3</sup> so total weight should be 395 Kg. Surface 656 m<sup>2</sup>
  - 394 kW/h that is 29,5 Kg of propane



# CALCULATED DATA

- **Ecomagic balloon**
  - Average consumption with 250 W/m<sup>2</sup>
  - M-56 size Expected 11,9 Kg propane



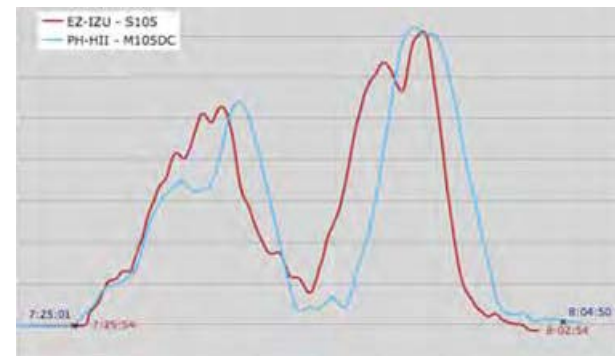
# REAL DATA

- M-56 EM Manufactured on Sept. 2007. Flight on 25/Sept/07
  - 435 Kg 27 Kg/100 m<sup>3</sup>
  - 46 min flight
  - 8 Kg consumption equals 10,4 Kg/h



# Standard versus EM similar flight conditions real example

	S-105	M-105 EM
TOTAL WEIGHTH	875,8	840,5
VOLUM	3000	3000
Load	29,2	28,0
TO time	7:25	7:25
Landing time	8:05	8:05
Weight landing	838,8	829,5
consumption	37	11
Kg/h	55,5	16,5



# CONCLUSIONS

- **Inconvenients**
  - Package volume
  - Relatively high cost of fabric and manufacturing
  - Expected life not known in detail
- **Benefits :**
  - Low consumption
  - Noise reduction
  - CO2 reduced emissivity
  - Propane cost saving
  - Safer flight in terms of higher endurance
- **Cost versus benefit**
  - No doubt for long distance/mountain flights or records
  - Interesting approach in passenger balloons

# THEORETICAL EXAMPLE

	<b>N-180</b>	<b>N-180 EM</b>	<b>N-180 50 % EM-UL</b>
TOTAL WEIGTH	1324	1324	1324
VOLUM	5100	5100	5100
Load (Kg/100m3)	25,9	25,9	25,9
Surface (m2)	1500	1500	1500
Theorical consumption (W/m2)	550	200	300
Consumption (Kg/h)	62,2	22,5	33,8
Saving consumption	----	39,7	28,4
Gas for 2 hours flight (min.)	124,4	45.0	67,6
Number of cyl	4,5	2	2,5
Weight of full cylinders	220	102	135
Number of extra pax	----	1	~
Saving in propane (€)	----	39,7	28,4
Saving in pax (€)	----	150	--
Saving after 500 hours or flights	----	94850	14200

# MORE CONCLUSIONS

- **Other important benefits**
  - For the pax (and pilot) : lower noise and heat
  - Also for the dogs...
  - Lower CO2 emission
- **A lot of different possible combinations**
  - Different Percentage of Double layer
  - 42 size manufactured for a DUO. Almost 4 hours duration flight.
  - Outside other fabric like Ultralast (now made an N-180 50 % double layer with outside silver Ultralast. First flight done 14 Nov. 2009 ). 26 Kg/h .
- **New development together with Pierrick Duvoisin**
  - Double layer without flocks
  - Very good performances with M-56 manufactured
  - Balloon has to be complete Double layer. Still under study.



# PHOTOS



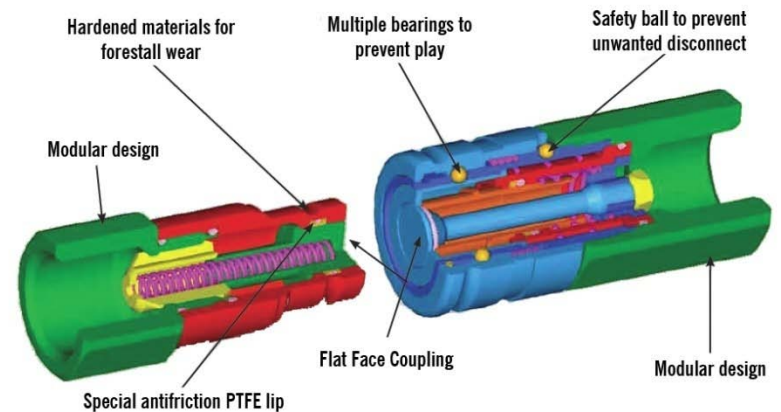
# PHOTOS



# OTHER IMPROVEMENTS

- FASTFLAT CONNECTOR

- Easier connection
- No dust entry
- Smooth flow



# TEKNO BALLOON

- Lightweight balloon (50 Kg.)
- Foldable basket (35 Kg.)
- Light Burner (12 Kg.)



# FUELTEK INDICATOR

- 100 % reading
- Easy calculation consumption
- Retrofitable
- Future PDA program





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