Transport and mobility management challenges for the world largest mega-event: 1992 to 2012 Summer Olympic Games

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1. World mega events

- Mega events are growing in size and numbers around the world, particularly sport mega events
- World Summer Olympics = about 8 million spectators and TV audience of 4 billion viewers (ratio 1 to 500)
- Sports mega events are universal: Summer/Winter Olympic Games, FIFA world football Cup, Commonwealth Games, Asian Games, UEFA Cup, Pan American Games (Rio 2007), America’s Cup....
What is a “mega event” from an urban logistical-transport standpoint?

Big football match at new Wembley Stadium (90’000 spectators) = not a mega event / has only localized transport impacts on London

But the Cannes Film Festival (25’000) = is a mega-event in a City of 50’000 population

Mega event = is an event “where” most of the City transport system and urban logistics are impacted by the “festive” celebration
Mega events have considerable transport and traffic impacts: 1.5 to 2.0 million additional trips/day

- Traffic highly peaked and geographically oriented
- Host City transport systems -- all modes--to be operated to their limits using innovative traffic management strategies and techniques
- Mega events like the Olympics have been constantly growing-- especially logistics and out event attendance (non ticketed)
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<tbody>
<tr>
<td></td>
<td>NOC</td>
<td>Events</td>
<td>Athletes</td>
<td>Fem</td>
<td>Medias</td>
<td>Tickets</td>
<td>TV rights</td>
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<tr>
<td>1984</td>
<td>Los Angeles</td>
<td>140</td>
<td>221</td>
<td>6’800</td>
<td>23</td>
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<td>1988</td>
<td>Seoul</td>
<td>159</td>
<td>237</td>
<td>8’500</td>
<td>26</td>
<td>11’300</td>
<td>3.3</td>
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<td>1992</td>
<td>Barcelona</td>
<td>169</td>
<td>257</td>
<td>9’400</td>
<td>29</td>
<td>13’100</td>
<td>3.0</td>
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<td>1996</td>
<td>Atlanta</td>
<td>197</td>
<td>271</td>
<td>10’400</td>
<td>34</td>
<td>15’100</td>
<td>8.3</td>
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<tr>
<td>2000</td>
<td>Sydney</td>
<td>200</td>
<td>300</td>
<td>10’600</td>
<td>38</td>
<td>16’000</td>
<td>6.7</td>
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<tr>
<td>2004</td>
<td>Athens</td>
<td>202</td>
<td>301</td>
<td>10’600</td>
<td>42</td>
<td>21’500</td>
<td>3.8</td>
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<tr>
<td>Growth</td>
<td>1984-2004</td>
<td>+45%</td>
<td>+35%</td>
<td>+55%</td>
<td>+85%</td>
<td>+135%</td>
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<tr>
<td></td>
<td>20 years</td>
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Legend:
1. Number of NOC/nations
2. Number of competition/events
3. Number of athletes (±50)
4. Percentage of female athletes (%)
5. Number of accredited medias (±50)
6. Number of spectator tickets sold (in millions ±0.05mio)
7. Total TV rights (mio US$, ±5 mio)
Olympic numbers

- Olympics—17 days including opening+closing ceremonies
- 16’500 athletes and team officials (stable)
- 22’000 medias (growing)
- 5’000 Olympic officials / VIP+VVIP (stable)
- 50’000 sponsor guests (growing)
- 100–150’000 staff+workforce (variable)
- 50–150’000 volunteers (variable)
- 300–600’000 ticketed spectators/day (variable)
- 100–250’000 non ticketed visitors/day (growing)
- the whole Host City population
2. Transport main challenges

**Three superimposed transport systems:**

- 1. “Permanent” *background transport system* -- with new, extended and renovated infrastructures

- 2. “Temporary” *strongly "boosted" public transport system* for mass transport of spectators + workforce + volunteers + non ticketed visitors

- 3. “Temporary” *dedicated Olympic transport system* for accredited Olympic Family personals, sponsors, special guests, Games logistical functions
Olympic transport: three superimposed systems

TEMPORARY “DEDICATED OLYMPIC TRANSPORT SYSTEM”

TEMPORARY “STRONGLY RE-ENFORCED PUBLIC TRANSPORT SYSTEM”

PERMANENT “HOST CITY TRANSPORT SYSTEM” *

* With new, extended, renovated infrastructures and Operation systems
  With connections to national + international transport systems

bovy 30.6.2007
At Games time, traffic services must serve three different client-groups:

1. **Non-Olympic background travel demands** by all modes (often with area wide traffic reductions)
2. **Olympic spectators, volunteers and workforce** (500 000 to 750 000 per day) by mass public transport
3. **Olympic accredited constituent groups** and suppliers (50 000 to 70 000 per day) by dedicated car, limousine, bus chartered transport
World mega events are a catalyst for transport infrastructure developments:

- **new facilities**, metro lines, motorway rings or links, new airport and new terminals
- **extensions** of existing transport infrastructures, motorway to stadium, metro extension to Olympic Park...
- **major upgrade/renovations** of capacity and quality of service of existing facilities
...operations developments...

- Temporary *dedicated network of Olympic priority lanes* (between 80 and 300 km) *for the duration of the mega-event*
- Strengthening of centralized, integrated traffic control and command operations
- *Temporary reduction of background traffic (20% to 35% or even more)* City wide, per urban sector or corridor for congestion relief and environmental reasons
- *Enforced “no parking” policies* within 1/2 km of Olympic venues *to “forster” 100% public transport Olympic event accessibility*
...venues as focus points...

- Transport systems must provide safe and reliable *double accessibility* called front of house (FOH) and back of house (BOH)
  - Venue “FOH” shall accommodate spectator crowds
  - Venue “BOH” shall handle all Olympic Family accredited travel and all Olympic logistics
...tough scheduling...

- 17 day Olympics = 17 different pre-planned daily transport schemes subject to event re scheduling
- Build-up of travel traffic demands; first week 200’000-300’000 spectators per day, escalating to 500’000 at mid-Games
- Olympic Family transport system composed of specialized subsystems to guarantee higher reliability: athlete transport, media transport, sponsor transport, IOC officials + VIP +VVIP transport
### XX Olympic Winter Games-Torino 2006 - Competition Schedule - February 10-26, 2006 - as of Oct 6th, 2005

<table>
<thead>
<tr>
<th>February</th>
<th>FRI 10</th>
<th>SAT 11</th>
<th>SUN 12</th>
<th>MON 13</th>
<th>TUE 14</th>
<th>WED 15</th>
<th>THU 16</th>
<th>FRI 17</th>
<th>SAT 18</th>
<th>SUN 19</th>
<th>MON 20</th>
<th>TUE 21</th>
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**Daily Medals Award Present:**
- 4
- 8
- 4
- 6
- 5
- 7
- 4
- 4
- 4
- 7
- 5
- 4
- 1
- 2

**Medals Ceremony in Medal Plate:**
- 1
- 4
- 1
- 2
- 2
- 2
- 1
- 0
- 2
- 6
- 1
- 6
- 2

**Medals Ceremony on Venue:**
- 1
- 4
- 1
- 2
- 2
- 2
- 1
- 0
- 2
- 6
- 1
- 6
- 2

**Total daily Medals Ceremonies:**
- 2
- 7
- 6
- 4
- 5
- 7
- 6
- 5
- 1
- 4
- 3
- 11
- 2

**Legend:**
- (C) Competition
- (L) Long Track
- (S) Short Track
- (P) Pursuit
- (F) Final
- (F) Fastest
- (F) Final
- (F) Fastest

Note: Please refer to the schedule for detailed event information.
transport governance...

- Transport system temporary governance is a difficult issue.
- Intermingling and vertical interactions of national, regional and local entities (Public Works, Transport, Security, etc).
- The toughest challenge: deliver one single “product” called reliable mobility for all client groups.
OCOG TRANSPORT
INTERACTIONS WITH PUBLIC SECTOR AGENCIES AND PRIVATE OPERATORS

Note: Organisation and linkages between all entities vary widely from Games to Games.
3. Barcelona 1992

1992 Barcelona Olympic Games

- City pop: 1.7–3.0 mio / Spain pop: 40 mio
- Participating countries: 169
- Events: 257
- Athletes: 9’400, 29% female
- Medias: 13’100
- Tickets sold: 3,0 mio
- TV rights: 835 mio $
Barcelona = “smaller” (1.7–3,0 mio) City than usual for Olympic Summer Games

Olympics = catalyst of urban sea front urban and coastal renovation, internal harbour, major public space enhancement

From a rather “sleepy southern City”, Barcelona has become one of the most attractive year round tourist destination of Europe -- an outstanding achievement
Atlanta 1996 Olympic Games

- City pop: 4.1 mio / USA pop: 265 mio
- Participating countries: 197
- Events: 271
- Athletes: 10'400, 34% female
- Medias: 15’100
- Tickets sold: 8,3 mio
- TV rights: 900 mio $
Atlanta’s problems

- Games conceived as a “unique” financially profitable affair
- No urban and transport development legacy
- Poorly organized transport systems and under trained transport staff
- Insufficient and unreliable transport services unable to cope with event peaks, program changes....
- Transport organization shortcomings gave a bad image to these Games
4. Sydney 2000

Sydney 2000 Olympic Games

- City pop: 4.2 mio / Australia pop: 19 mio
- Participating countries: 200
- Events: 300
- Athletes: 10’600, 38% female
- Medias: 16’000
- Tickets sold: 6,7 mio
- TV rights: 1330 mio $
Sydney Olympic Park

- After Atlanta 1996 transport failures...Sydney had to provide an absolutely “reliable” Olympic transport organization!
- *Concept of a vast new suburban Olympic park 15 km away from downtown*
- Model for all future Games.. Athens, Beijing, London
- Clustering of sport venues with a new “national” Stadium, large press and broadcasting centres (IBC/MPC), Olympic Village nearby...
- Existing or new transport rail link connecting Olympic Park to metropolitan area
...Sydney testing + testing...

- Large number of new facilities, made real scale functional testing necessary
- Olympic Park transport facilities were tested three times: -30 months, -18m and -6months to Games
- Use of a highly popular agricultural event, the “Royal Easter Show”, to test Olympic systems at about 40% of Olympic peak loading
- Harassed by extremely negative and continuous media criticism, Olympic transport organizers could demonstrate the robustness of their transport plans 2 1/2 years before Games
public transport boost…

- Sydney 2000 were the first Olympic Games to successfully implement a double policy:
  (A) “100% spectator by public transport”
  (B) “0% public parking at venues”
- Public transport had to be considerably strengthened, new high capacity Olympic Park station
- Olympic express bus lines serving areas between rail corridors
- 24 hour free public transport for ticketed spectators
...prestigious Olympic venue...
6. Athens 2004

Athens 2004 Olympic Games

- 108 years after 1996 first modern Olympiad
- City pop: 4.0 mio / Greece pop: 10.5 mio
- Participating countries: 202
- Events: 301
- Athletes: 10’600, 42% female
- Medias: 21’500
- Tickets sold: 3.8 mio
- TV rights: 1495 mio $
Athens 2004

...Marathon arrival in this Stadium on August 29th 2004, 108 years+ after the first modern Olympics
Transport redevelopment

• The 2004 Olympic Games gave a considerable development “boost” to Athens metropolitan transport system
• 25 year delayed progress in 7 years!...
• Completion of urban motorway system + major highway up grades
• Doubling of rail system capacities: new suburban rail, subway extensions and new light rail
ATHENS
Major Road Network Extensions and Improvements for the 2004 Olympic Games

Legend:
- New 4 to 6 lane motorway or major arterial
- ** Widening of existing road to 2 x 2 lanes
- Red Existing Olympic Road Network

Source: ATHOC 2004 Transport and Prof. Boy, June 2004
ATHENS SCHEMATIC RAIL SYSTEM DEVELOPMENTS
Olympic lane network

- To substantially decrease Olympic travel times, the longest and most efficient (so far) Olympic lane network (160km) was implemented.

- Games time bus commercial speed averaged an extraordinary 50–55km/h (normally 12–18km/h).

- Highly critical of Athens poor traffic conditions and lack of infrastructure developments, world medias ...were taken by surprise...and called it “the best Olympic transport”
Beijing 2008 Olympic Games
(most numbers are still estimates)

- City pop: 12–15 mio / China pop: 1300 mio
- Participating countries: 202
- Events: 301
- Athletes: 10’600
- Medias: 21’500
- Tickets sold: 7,0–9,0 mio (?)
- TV rights: …?… mio $
• Outstanding motorway developments, particularly the addition of 5th and 6th ring roads
• Subway (metro) expansion, with three new lines serving North and central Beijing and Olympic Green—doubling the metro system capacity in 6 years
• Building of new National Airport terminal with new rail connection to City Centre
• Construction of new high performance BRT (bus rapid transit) line serving North Beijing and Olympic Green
The Transport and Venue Map for the XXIX Olympic Games
1. Forest Park
2. Olympic Village
3. Convention Center
4. Reserved Land For Future Department
5. China Science & Technic Museum
6. National Indoor Stadium
7. National Swimming Center
8. National Stadium
9. Olympic Sports Center Gymnasium
10. Ying Tung Natatorium
11. Olympic Sports Center Stadium
12. National Hockey Stadium
13. National Tennis Center
14. Yuan Dynasty City Wall Relics Park
15. Landmark
16. Commercial Facilities
17. Reserved Land For Exhibition, Cultural and Sports Facilities
18. Information Center
19. Cultural Facilities
...beijing national stadium...
Beijing is witnessing an increase of 1000 cars/day over the past 5 years. Level of traffic congestion is getting out of hand severely aggravating air pollution. A bold plan of 270 km of Olympic Lanes is prepared to link all Olympic competition and non-competition venues. To guarantee Olympic lane operation reliability and improve air quality a major traffic reduction scheme has been studied.
In August 2007, exactly one year prior to the 2008 Games a 4 day “traffic reduction + environment test” was conducted in Beijing Metropolitan area.

A strictly enforced alternate odd/even licensed plate cars only driving on odd/even days produced a 43% reduction of traffic volumes.

Out of a total car registration of 3.05 million for Beijing, 1.3 million cars (43%) were taken off the road system.

Average traffic operating speeds immediately increased of about 70%.
A substantial strengthening of public transport services was implemented--all metro trains, bus and trolleybus reserves put to services--longer operating hours.

The traffic reduction had a spectacular beneficial impact on bus performance: +50% increase of operating speeds (from 14km/h to more than 20Km/h) and a boost of transport productivity (more bus.km of service per day).

Air pollution decrease was not as spectacular as expected (detailed analysis under way).
• In conjunction with the “traffic+environment” four day test, a 2 hour 20 km/h Olympic lane test was conducted
• 50–55 km/h bus average test bus speeds could be achieved using reserved (coned) Olympic lanes
• The experiment proved to the Beijing traffic police that Olympic reserved lanes can work only with the “40% traffic ban”
• Both policies will be implemented during the 2008 Games
• Beijing government is studying to maintain such traffic reduction policies after the Games
London 2012 Olympic Games
(most numbers are still estimates)

• City pop: 8–13 mio / UK pop: 60 millions
• Participating countries: 202
• Events: 300
• Athletes: 10’600, 43% female
• Medias: 21’500
• Tickets sold: 9,5 mio
• TV rights:…?.. mio $
Transport strategies...

- East London industrial waste land remediation to build the new urban Olympic Park
- Approval by Parliament of an “Olympic law” leading to a “Transport Plan for London 2012 Olympics”
- Multi-billion pounds (6 billion £) rail performance upgrade, rehabilitation and extensions mostly in East London
- Olympic Park articulation on 2 main rail stations: new Stratford International -- high speed rail line to Continent and Paris and Stratford Regional -- rehabilitated East London 9 line rail hub
• Toughest challenge in highly traffic congested London is to implement 250km of Olympic priority routes connecting all major Olympic venues

• Advanced engineering used to integrate temporary reserved Olympic lane system in London often narrow central City road system

• Careful temporary integration of Olympic venues in prestigious historical sites—only soft engineering measures applied

• Traffic measures planned for the Games but maintained for legacy whenever required or possible
Games transport integration is an extremely complex and costly operation: between 2 to 10 billion $ in long term infrastructure investment (legacy) and 100–150 million $ in very short duration Games transport operating costs.

Since start of Beijing 2008, IOC has initiated the OGGI project.

OGGI = Olympic Games Global Impact, is a research tool developed to analyze economic, environmental and societal changes and impacts of Olympic Games.
Summer and Winter Olympics have a stable format but are delivered in different Cities.

Olympic transport has to be retro-fitted in each new Host City, a particularly complex task.

To constantly improve Games service quality and local organizers competences, IOC is investing heavily in TOK – Transfer of Knowledge.

TOK has many forms and starts with applicant bidding Cities 9 years prior to potentially hosting the Games.
One TOK activity is “professional observation and monitoring” of previous Games during their delivery.

Potential 2016 organizers are encouraged to participate to “observer programs” of 2 Summer Games (2008 and 2012) and 2 Winter Games (2010 and 2014).
OLYMPIC TRANSFER OF KNOWLEDGE
AND GAMES OBSERVER PROGRAMS

BEIJING 2008  LONDON 2012  HOST
WINTER  2014  CANDIDATE
2010
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017

Legend:
- Summer Games Preparation
- Host City Selection
- Winter Games Preparation
- Olympic Games
- BT Basic bidding training
- O1 Observer Programs
- O2 for 2016

Olympic Games Knowledge Management (OGKM) Seminars and more than 40 Olympic Function Technical Manuals complete the Transfer of Knowledge (TOK) global program
learning by testing...

- Since Sydney 2000, all sports venues shall be tested one year prior to Games with similar national/international events
- Major transport facilities such as new airport terminals, new rail or subway stations close to venues, new traffic management schemes must be fully tested
- Testing aims are multi-fold: to train operation staff, to test chain of command and project governance, to optimize the use of facilities, to develop contingency plans and to minimize risks
- Mega events are unique, failure is not tolerated!...
...final words...

- Mega events like the Olympics are “real scale, live laboratories” to experiment with new transport policies and advanced traffic management schemes.
- An outstanding challenge: much higher urban travel demands must be met with less vehicular traffic, less energy consumption and better environmental conditions
- ...it is a contribution towards more sustainable urban mobility....
Games organization = three basic requirement levels

Concept: 4 key words + 2

Motivation: Economical, environmental, socio-cultural impacts -- Festivities
CELEBRATION + LEGACY

Administration: Coordination -- Guarantees
GOVERNANCE

Technical: Venues, Transport
EXCELLENCE

Athlete priority

SECURITY

<Transport interactions>
...six key words...

• “Celebration” is a transport challenge, but “Legacy” is the long range aim
• “Governance” toughest transport challenge during all phases: from bidding to delivery and legacy (transport is overwhelmingly public sector)
• “Excellence” in transport operations and traffic management and service reliability
• “Security” and safety permeates all transport planning and operations
• “Consistency” is the common denominator of the mega-event endeavour