



DEMASST Final forum

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EADS Astrium (FR)



THALES Security
Systems (FR)



Fraunhofer (DE)



TNO (NL)



FFI (NO)



VTT (FI)

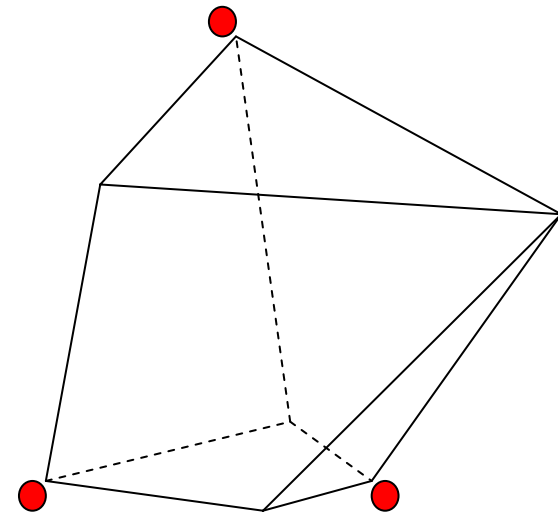
DEMASST – the phase I study of the FP7-SEC Mass Transportation Security programme

- Started late due to security scrutiny procedure – January 2009, ends May 2010
- Has strived to inform phase II as it evolved
 - Input to European Commission
 - Notably EC/DE workshop, Berlin March 2009 (input for phase II call text)
 - Input to prospective phase II consortia
 - Most deliverables and workshops public
 - DEMASST partners active in both SECUR-ED (8 partners) and TOPSEC (3 partners)
 - Input to the selected phase II project
- But also to identify future research needs
- And in helping to develop the DP instrument for European security innovation in general

Today's final forum

- Presentation of results
- But also a chance to have impact on conclusions
- Partly formal presentations, partly interactive workshop
- Programme
 - **13:00** Introduction, E. Anders Eriksson, FOI
 - **13:15** EC perspective, Ngandu Mupangilai, Khoen Liem, DG ENTR
 - **13:45** Demonstration for security innovation, Christian Carling, FOI
 - **14:00** Threat analysis, Ilpo Kulmala, VTT
 - **14:15** Mass transportation context and needs, Jolanda van Deursen, TNO
 - **14:30** Break
 - **15:00** Workshop: Way ahead for Mass Transport Security
 - Intro 1: Strategic roadmap, Sven Holmberg
 - Intro 2: Future RTD needs, Robert Bains
 - Interactive workshop
 - Wrap-up
 - **17:00** End of programme

- FP7-SEC has five DPs in the pipeline
 - Border security
 - Mass transportation security
 - CBRNE (Chemical, Biological, Radiological, Nuclear agents and Explosives)
 - Logistic and supply chain security
 - Aftermath crisis management
- *These five problem areas are quite different*
- *This is a good idea in order to develop an effective approach to system-of-systems level security research and innovation!*



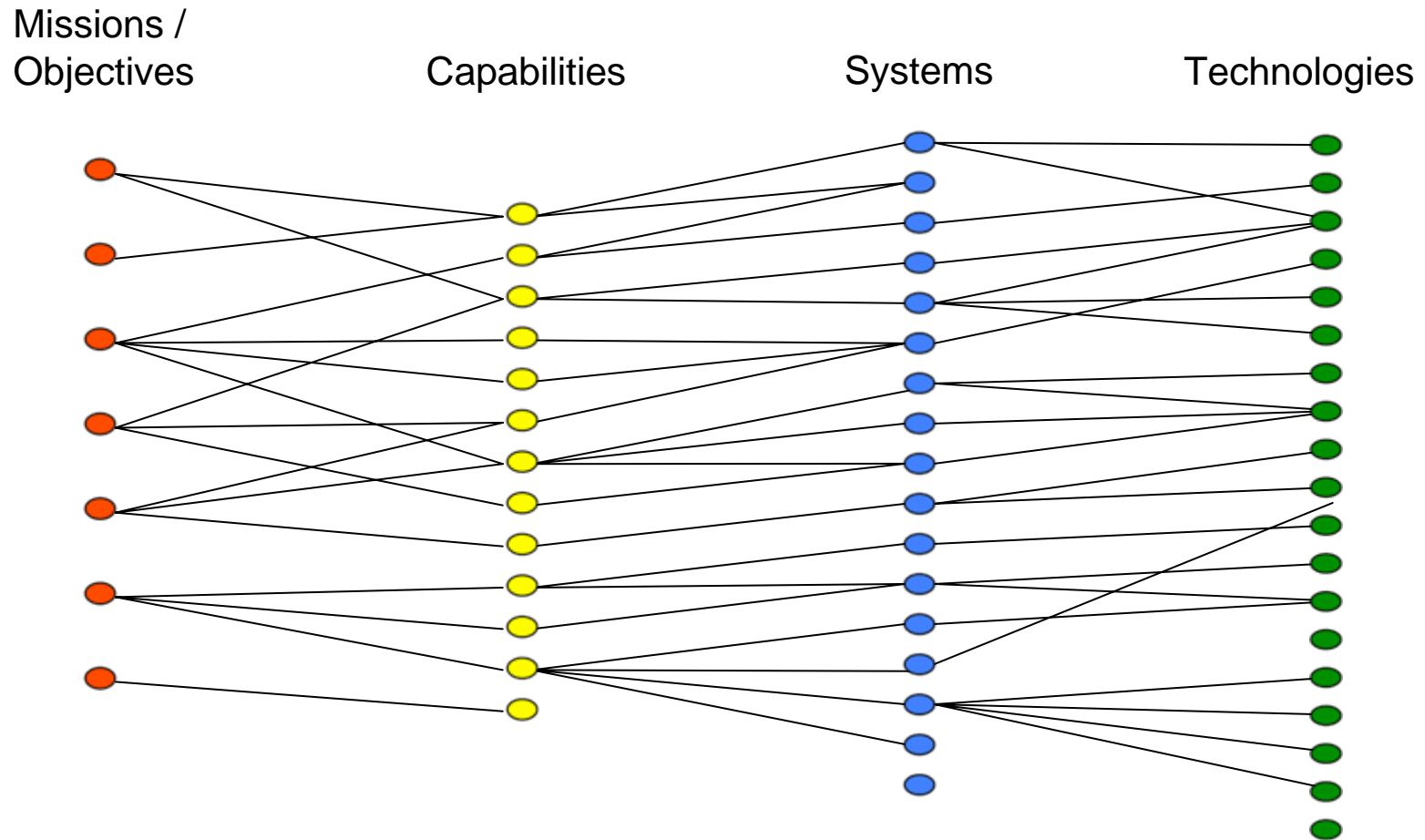
Why a systems-of-systems (vs. an integrated systems) approach is particularly pertinent to mass transportation security – 1/2

- A “[s]ystem of systems is a collection of [...] systems that pool their resources and capabilities together to obtain a new, more complex, 'meta-system' which offers more functionality and performance than simply the sum of the constituent systems.”
- A highly integrated system can typically be made very cost-effective for a narrow range of tasks. In contrast a system of system approach has its strength when confronting a wide range of tasks, solvable by composing constituent systems in different ways, as enabled by an overall architecture and standardised interfaces.

Why a systems-of-systems (vs. an integrated systems) approach is particularly pertinent to mass transportation security – 2/2

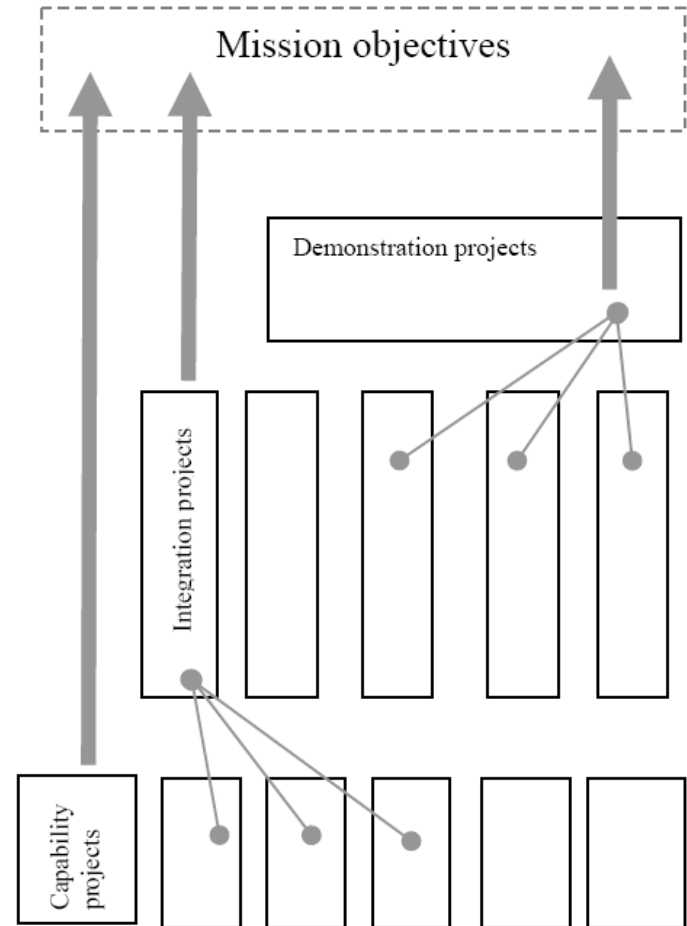
- A system of systems is typically characterised by the following properties:
 - operational independence of elements
 - managerial independence of elements
 - evolutionary development
 - emergent behaviour
 - geographical distribution of elements.
- Due to this, modelling and analysing systems of systems typically involves:
 - inter-disciplinary study
 - heterogeneity of systems
 - networks of systems
- *Such meta-system approach is necessary to enable a major boost of MT security without excessive costs*
- *This does not, however, mean that the system-of-systems thinking is easy to sell to MT stakeholders!*

Generic system-of-systems map



The Demo programmes in FP7-SEC

- **Are demonstration programmes all about demonstration activities?**
 - Demonstration activities could – and should – be performed both in CPs, IPs, and DPs
 - The term DP can therefore be slightly misleading
 - DPs = programmes at system-of-systems level
 - Before something can be demonstrated it must be developed
 - In the system-of-systems world this requires extensive experimentation
 - Hence **DEP = Demonstration and experimentation programme as alternative to DP**



Demonstration & Experimentation methodology

- D&E needs combination of real systems and *in silico* work. Simulation needed when tasks are:
 - Difficult – typically complex interfaces
 - Dull – typically very many possible parameter combinations
 - Dangerous – including ethically problematic
- ...and for transfer/generalising of results
- Exploit the full range of D&E methods:
 - “Live” experiments under conditions of ongoing real operations
 - Experiments in real operational setting but not under conditions of real operation
 - Experiments in dedicated facilities emulating real operational settings
 - “System-in-the-loop” simulation test-beds
 - Man-in-the-loop simulation (including Virtual Reality applications)
 - All computer simulation.
- ...and also “non-experiments”:
 - “natural experiments”
 - “discursive experiments”

Criteria for MTSDEP design

- General criteria for MT security solutions
 - Cost-effectiveness
 - Adaptable to fundamental characteristics of mass transport.
 - e.g. able to manage huge flows of travellers without causing delay or disturbance
 - Social and legal acceptability
- SDEP oriented criteria
 - Appropriate technological uncertainty/immaturity
 - Operational synergies
 - “Experimentability” in real life
 - Industrial/developmental synergies
 - Diversity in terms of technical and socio-cultural legacy

Why is mass transportation security important?

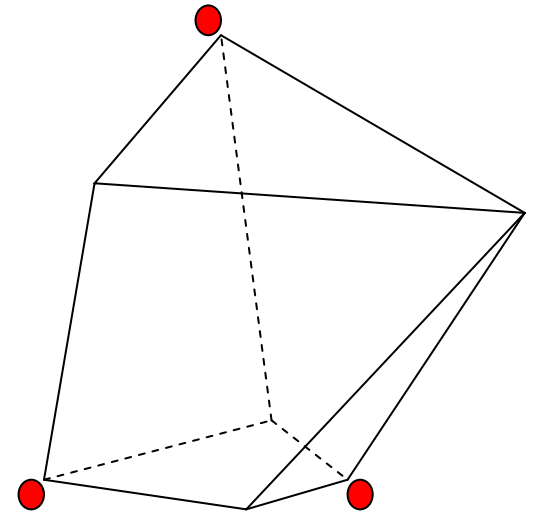
- NB: mass transportation defined as urban & regional public transport
- Extremely high densities of people
 - accidents, terrorist attacks, contagious diseases, etc. may create very major casualties
- Public transport is a critical infrastructure for the good functioning of all metropolitan regions
 - disturbances very costly
- Increased market share for Public transport has big environmental upside
 - requires improvement in security and other dimensions of quality of service

Why is mass transportation security so difficult?

- Generally no acceptance of cost increase
- Generally no acceptance of delay and discomfort
- Varying but generally low acceptance of intrusions of privacy
 - strong competitor in the car
- Open systems with many entry points
- Each regional MT system a unique system-of-systems
 - with its unique security system-of-systems
- A wide range of risks and threats
 - perceived and prioritised quite differently among European regions
- Fragmented ownership and responsibility structures – unique for each region
- *How can we avoid solving but a very limited part of the problem???*

What is needed for a successful MTSDEP? (1/3)

- Literally speaking a programme with limited time and resources can only *solve but a very limited part of the problem* in a concrete and directly demonstrable way
- BTW, technically these solutions should as much as possible be based on COTS products
- However, by selecting a varied set of demo tasks (risks and threats) we can create a sufficiently broad knowledge platform to enable sustained innovation:
 - transferring solutions to new cities,
 - modifying them for new risks & threats,
 - inserting new technologies into them...



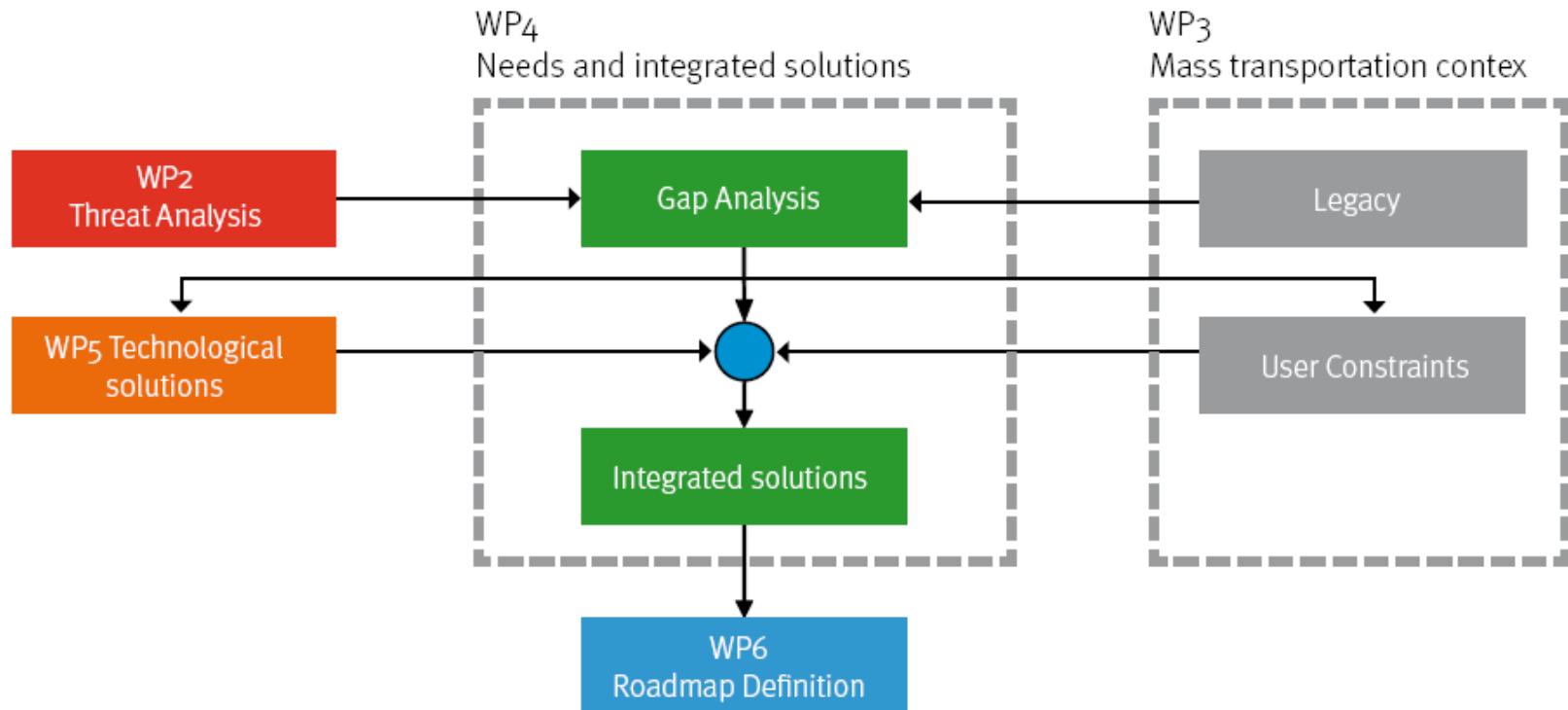
What is needed for a successful MTSDEP? (2/3)

- ...transferring solutions to new cities
 - Big differences between countries, big vs. medium-sized metropolitan areas etc.
 - Selection bias in DPs: mainly big cities prepared to pay the cost of active participation
- ...modifying them for new risks & threats,
 - Risks & threats will change over time!
- ...inserting new technologies into them
 - There seems to be a maturity gap in MTS relevant technologies
- In other areas, say blue border surveillance, both less heterogeneity in demand and higher technological maturity may allow other approaches like major pre-commercial procurement programmes

What is needed for a successful MTSDEP? (3/3)

- But in MTS we primarily need structural capital – knowledge infrastructure that remains after the project:
 - standards for architecture and interfaces, security procedures, cost-effectiveness assessment...
 - field labs (ranging from man-in-the-loop simulators through to instrumented real operational facilities)
 - modelling and simulation resources (indispensable for difficult, dull, and dangerous experimentation tasks)
- *Can we expect the market to sustain this infrastructure or is there a need for continuing public funding also after the end of the programme?*

DEMASST Work package structure



Deliverables, first period

Del. no.	Deliverable name	WP no.	Lead beneficiary	Estimated indicative person-months	Nature	Dissemination level	Delivery date (proj. month)	Actual delivery
D6.1	Briefing for EC/DE workshop *	6	FOI	3.5	R	PU	M3	M8
D4.1	WS2: Gaps and candidate solutions	4	TNO	1	O	RE	M4	M8; revised M9
D3.1	Current status of security in mass transport	3	INECO	7.25	R	PU	M5	M9; revised M10
D2.1	Report on key factors and threat scenarios	2	VTT	5	R	CL restricted **	M6	M9; revised M10
D2.2	Threat matrix and risk estimation	2	VTT	5	R	CL restricted **	M6	M9; revised M10
D4.2	Report on gap analysis and candidate solutions	4	TNO	6	R	PU	M7	M9
D5.1	Current technological solutions and relevant research	5	SINTEF	6	R	PU	M7	M9
D4.3	WS3: Integrated solution identification*	4	TNO	1.5	O	RE	M7	M9
D1.1	Progress report for review #1*	1	FOI	3.45	R	PU	M8	M10

External and own presentations

Date	Description	Location
18 March	EC/DE workshop in preparation of phase II call	Berlin
8 May	EC conference Research Connection	Prague
13 May	EOS WG land transport	Brussels
9 June	UITP security commission	Vienna
30 Sep.	SRC09	Stockholm

Table 2: Europe-level presentations (2009).

Date	Description	Location
14 Jan.	WP6 meeting	Brussels
24-25 Jan.	Kick-off and workshop 1 (external participation)	Stockholm
18 March	WP6 meeting	Berlin
12-13 May	Workshop 2	Brussels
8 July	Workshop 3 (external participation)	Rijswijk

Table 6: List of project meetings (2009).

Milestone 1

- (Preliminary) threat analysis, mass transport legacy analysis, and gaps and integrated solutions finalised and tested at workshop