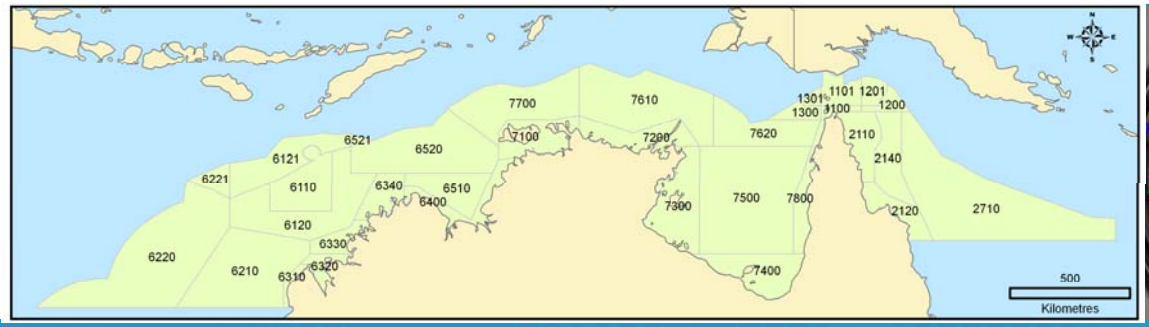

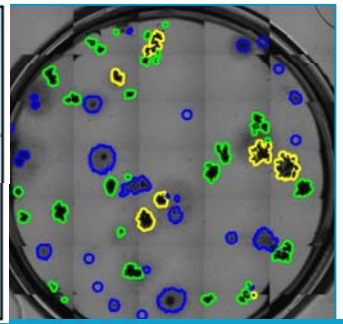

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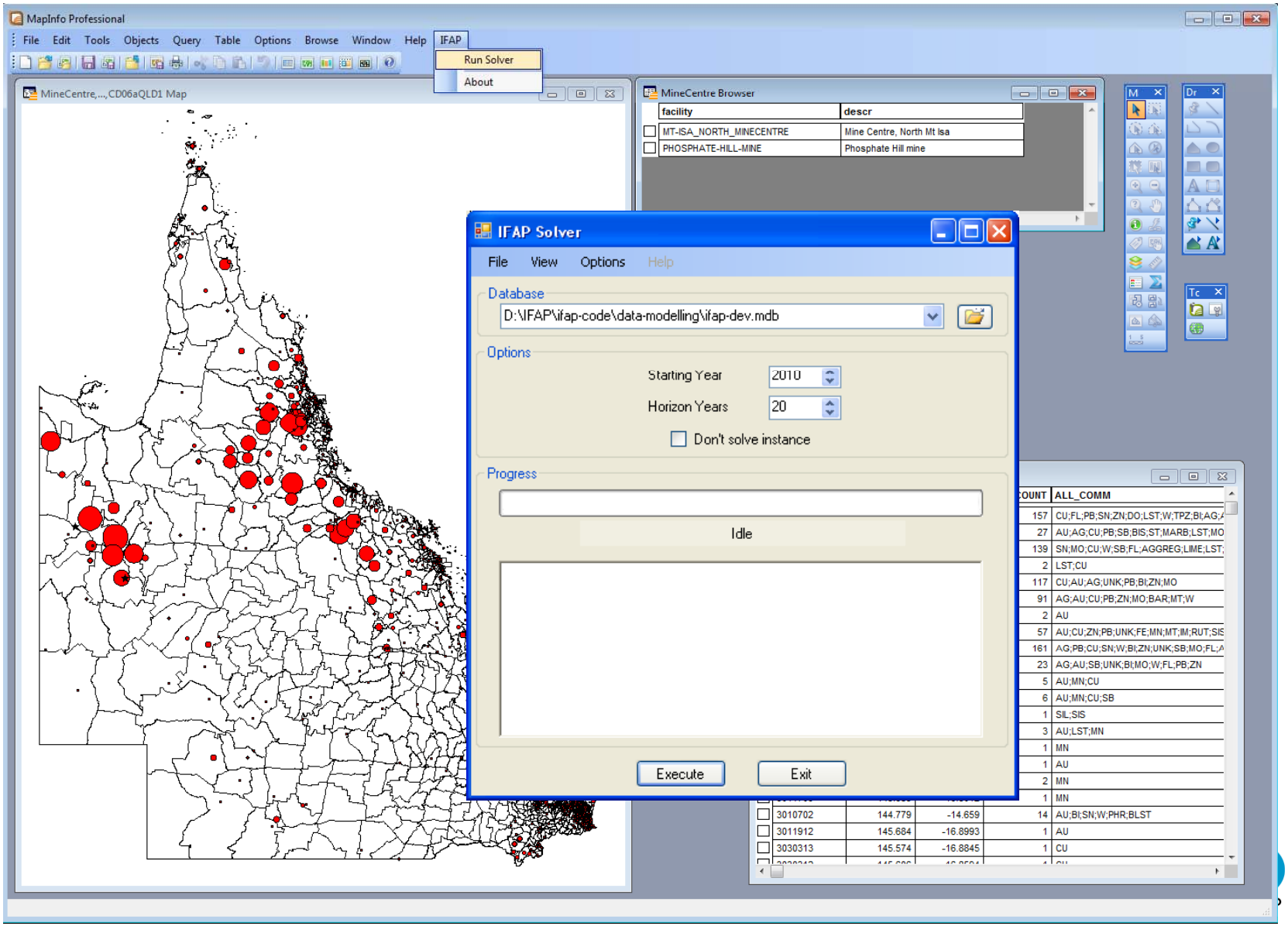
Optimising minerals transport infrastructure at the system level

Dr Simon Dunstall
CSIRO Services Oriented Systems Theme

Smart Transport Infrastructure Forum
April 2010

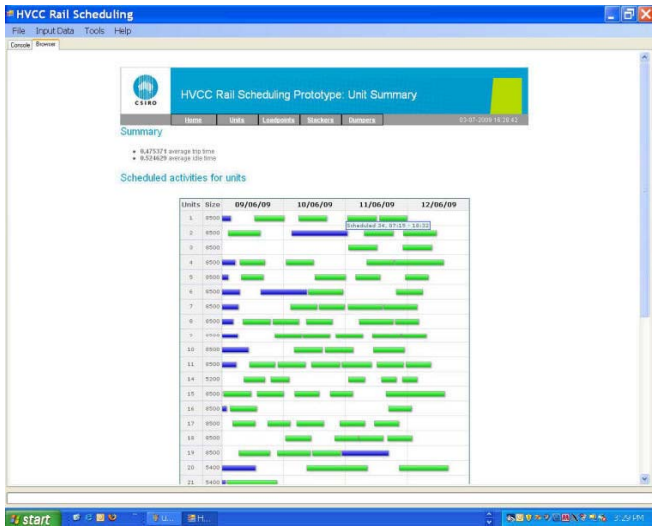
CSIRO

IFAP: Infrastructure Futures Analysis Platform

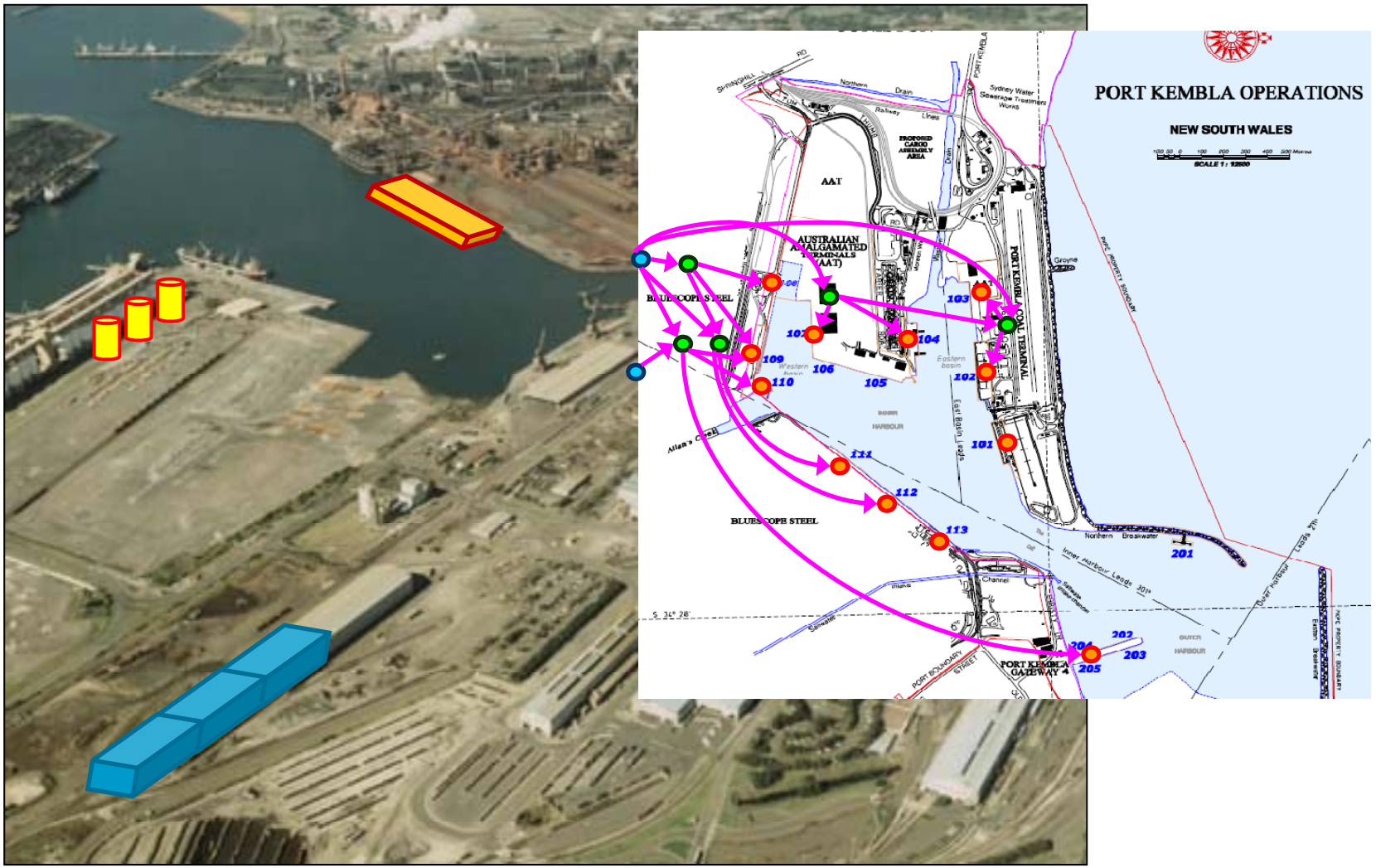


Hunter Valley

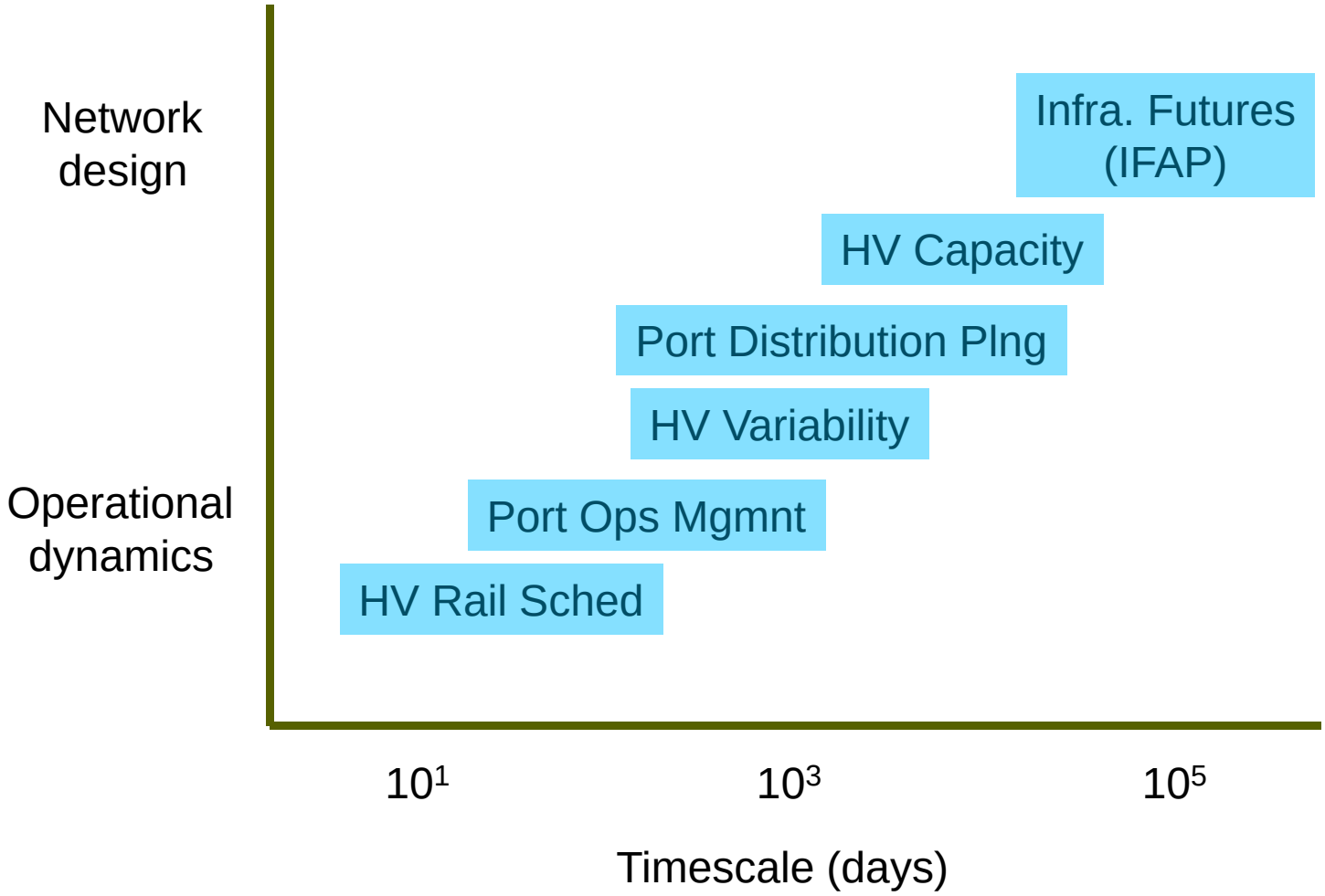
- Capacity Planning:
  - Rail network augmentation
  - Inland ports and other smart options
  - Load and unload point upgrades
  - Port changes
- Capacity Loss
  - Disruptions, variability and re-planning
- Rail Scheduling
  - Construct an optimised rail schedule for a number of days
  - Train trips are subject to system constraints such as load-point capacity limits, turn-around and refuelling delays, and train size limits
  - Optimise for throughput, train consist utilisation, preferred dumper and stacker combinations, and total units used.



Multi-purpose port planning



A continuum


Network design
Operational dynamics
Infra. Futures (IFAP)
HV Capacity
Port Distribution Plng
HV Variability
Port Ops Mgmnt
HV Rail Sched
10^1
10^3
10^5
Timescale (days)

What is hard and needing smartness?

- Quantitatively and exhaustively assessing a vast number of options
- “Routing and sizing” simultaneously
- Data and integration: information systems and culture
- Spatial data management

Additional smart infrastructure aspects

- Represent smart infrastructure via increases in throughput and capacity parameters
- Understand what “flow regimes” are system optimal and therefore must be brought about operationally
- Mimic smart operations management within infrastructure planning tools
- Demonstrate differences between quite smart and less smart transport operations management approaches

Where else does this apply?

- Postal and courier networks
- Agriculture and food processing
- Vehicle fleet management
- Service system design and resourcing