



STEM case studies

Adding data revenues in transition from GSM to UMTS

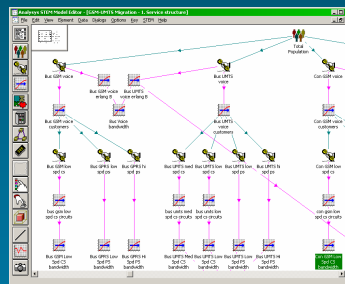


Robin Bailey – Head of Decision Systems Group
22 June 2006 – Algiers

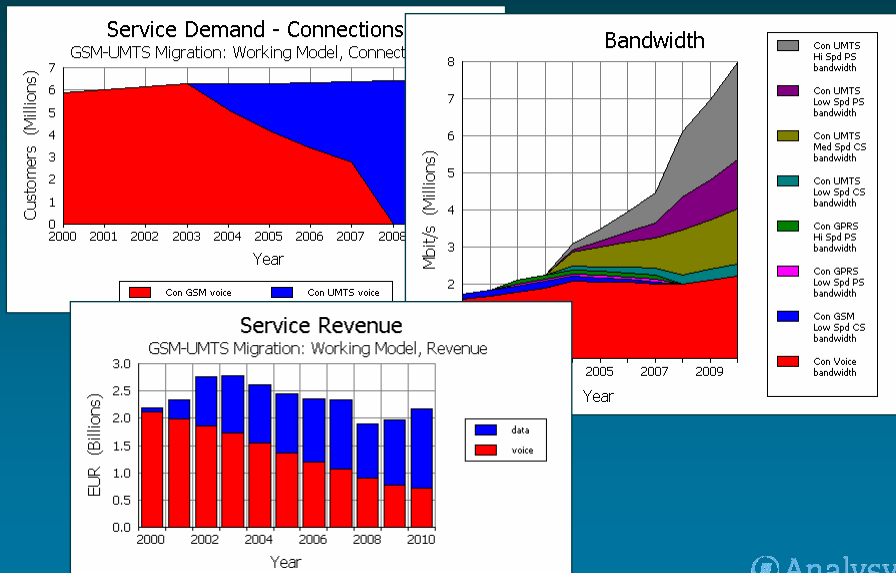
UMTS modelling with STEM

GSM network and UMTS overlay

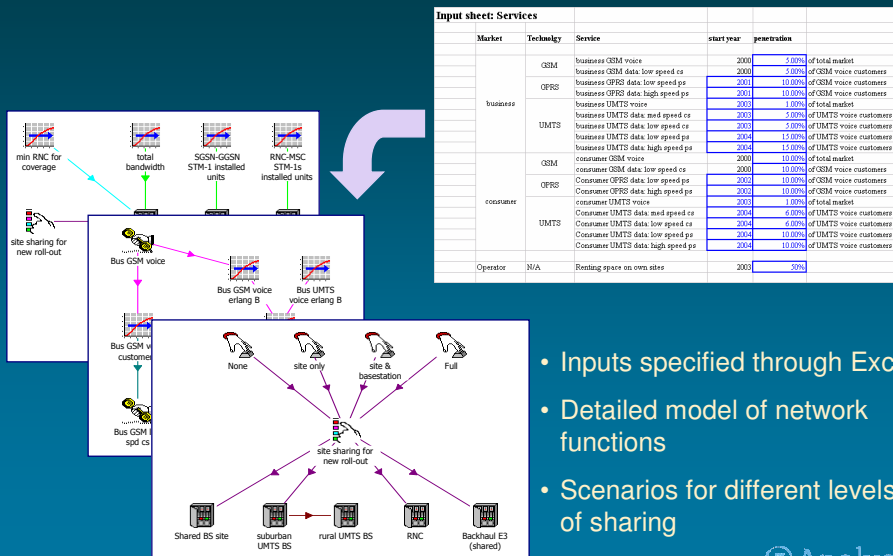
- Objective is to model the changing infrastructure of a cellular network over the next ten years as it migrates from GSM to GPRS to UMTS
- We explore the impact on capital expenditure and operating costs of sharing UMTS equipment with other operators



Revenues from new services



Outline model structure



- Inputs specified through Excel
- Detailed model of network functions
- Scenarios for different levels of sharing

Modelling approach

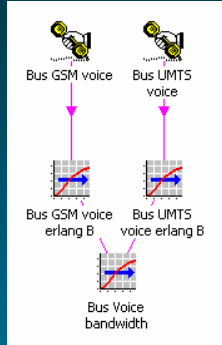
- There are significant distinctions between different customer revenue types
- Demand is mapped into common network circuit or bandwidth requirements ...
- ... and then disaggregated into different geographical classifications
- The model captures critical distinctions of deployment (configuration and cost)

Robin Bailey will perform an interactive demonstration of this model in Algiers ...

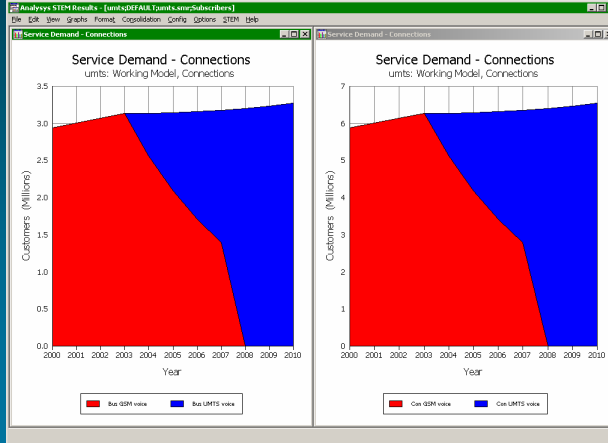


The following slides show a sample of the results

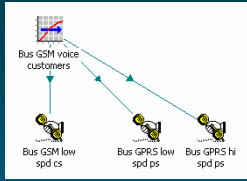
Subscribers



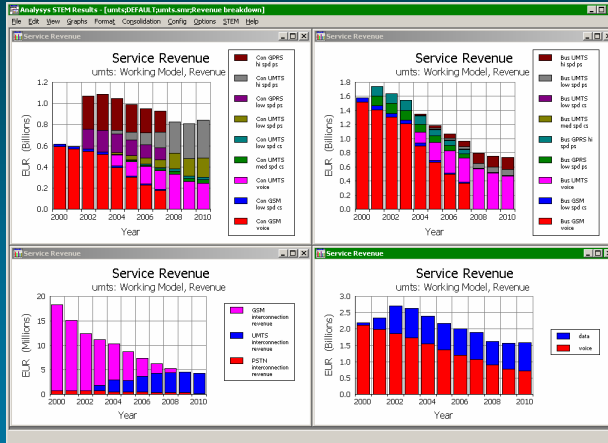
Business and consumer subscribers migrate from GSM package to UMTS



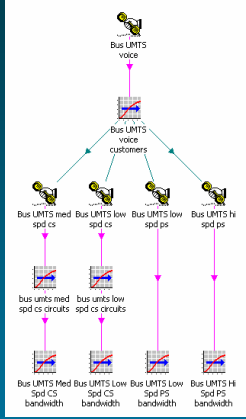
Revenue breakdown



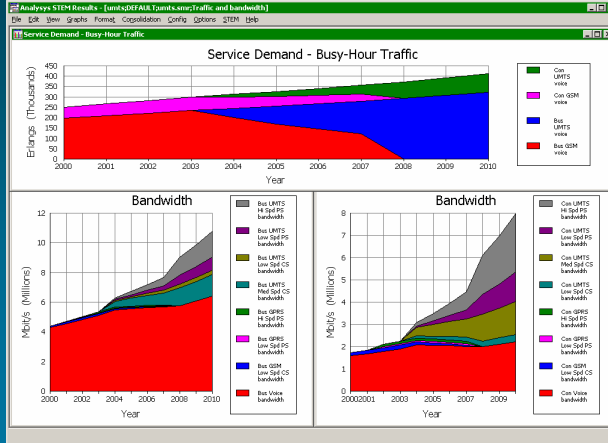
Decline in voice revenues is offset by increased data traffic



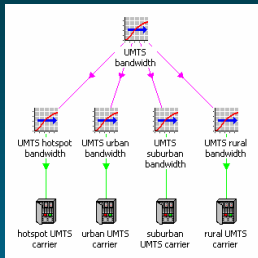
Traffic and bandwidth



Demand is mapped into common circuit or bandwidth requirements

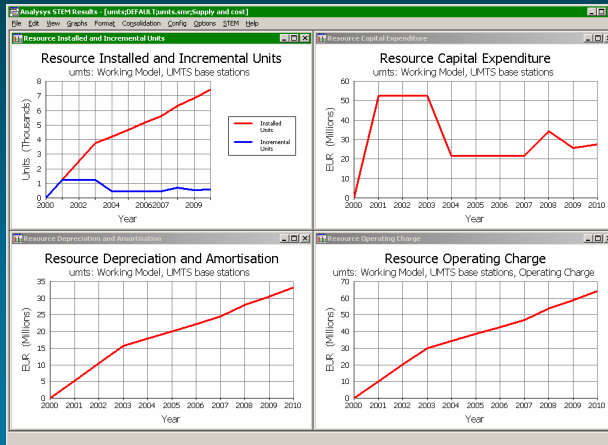


Supply and cost



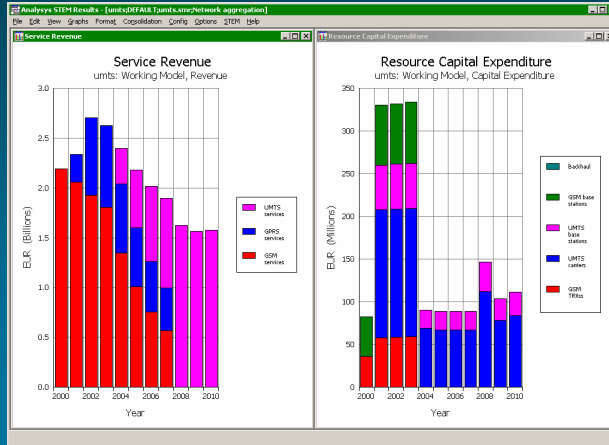
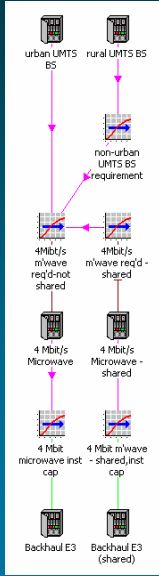
Bandwidth is disaggregated into geographical classifications

Detailed lifetime model of all network assets



Network aggregation

Automatic aggregation of revenue and cost elements



Financial statements

Profit and loss statement

Cashflow statement

Balance sheet

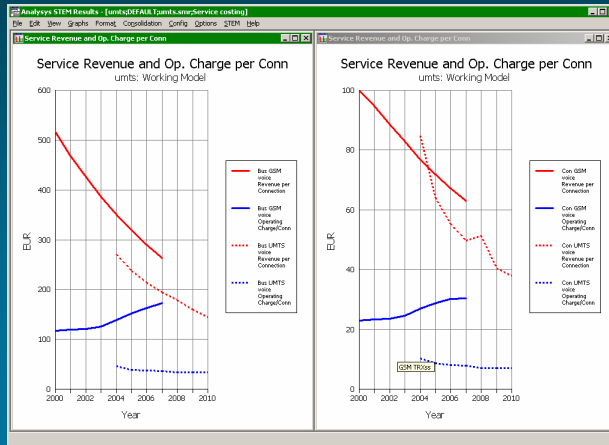
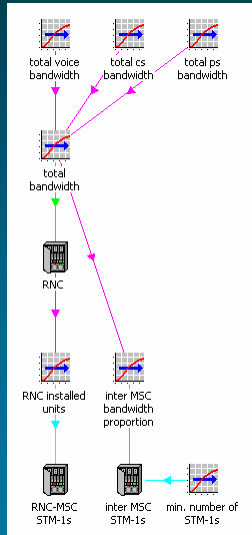
Standard financial indicators, such as NPV, IRR, ROCE

Analysis STEM Results - [unit:EUR/ML] [units:andFinancial Statements]																			
Network Profit and Loss Statement (units: Working Model, Network)						Network Cashflow Statement (units: Working Model, Network)													
ELP (Millions)	2000	2001	2002	2003	2004	2005	ELP (Millions)	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
Revenue	2,211	2,260	2,718	2,827	2,404	2,237	Pre-tax Profit	1,700	1,743	2,095	1,892	1,653	1,447	1,293	1,176	923	788	771	
Depreciation	183	213	246	283	294	296	Depreciation	183	213	246	283	294	296	295	289	303	212	222	
Amortisation	0	0	0	0	0	0	Amortisation	0	0	0	0	0	0	0	0	0	0	0	
Operating Costs	338	394	418	462	457	444	Op. in Disables less Creditors	195	7	301	0	281	17	123	101	101	0	-3	
Operating Profit	1,700	1,743	2,095	1,892	1,653	1,447	Fee Paid	0	0	0	0	0	0	0	0	0	0	0	
Interest Income	0	0	0	0	0	0	Cashflow from Operations	1,700	1,348	2,271	2,184	1,971	1,759	1,691	1,475	1,181	1,107	1,096	
Interest Expense	0	0	0	0	0	0	Cap. Ex - Intangible	180	470	498	821	174	144	177	200	307	276	291	
Pre-Tax Profit	1,700	1,743	2,095	1,892	1,653	1,447	Cap. Ex - Intangible	0	0	0	0	0	0	0	0	0	0	0	
Tax Charge	0	0	0	0	0	0	Change in Investments	0	0	0	0	0	0	0	0	0	0	0	
Net Profit	1,700	1,743	2,095	1,892	1,653	1,447	Change in Investments	0	0	0	0	0	0	0	0	0	0	0	
Dividends	0	0	0	0	0	0	Change in Investments	0	0	0	0	0	0	0	0	0	0	0	
Retained	0	0	0	0	0	0	Change in Investments	0	0	0	0	0	0	0	0	0	0	0	
ELP (Millions)	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Cash	27	32	34	38	38	37	36	36	35	34	33	32	31	30	29	28	27	26	25
Cash Deposits	744	2,209	3,980	5,638	7,437	9,033	10,457	11,732	12,609	13,470	1,772	1,663	1,797	1,595	1,424	1,275	875	831	804
Debtors	182	191	222	217	198	180	186	194	194	194	194	194	194	194	194	194	194	194	194
Current Assets	923	2,429	4,227	5,984	7,872	9,285	10,659	11,934	12,776	13,470	1,772	1,663	1,797	1,595	1,424	1,275	875	831	804
Net Intangible Assets	774	1,639	1,292	1,530	1,410	1,278	1,161	1,072	1,070	Average Creditor Days	29.46	28.18	26.79	25.76	30.00	30.00	30.00	30.00	30.00
Investments	0	0	0	0	0	0	0	0	0	Average Debtor Days	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Long-Term Assets	774	1,639	1,292	1,530	1,410	1,278	1,161	1,072	1,070	Operating Profit Margin	0.77	0.74	0.76	0.72	0.69	0.68	0.68	0.68	0.68
Total Assets	1,726	3,473	5,529	7,421	9,081	10,527	11,819	12,999	13,870	Pre-Tax Profit Margin	0.77	0.74	0.76	0.72	0.69	0.68	0.68	0.68	0.68
Overhead	0	0	0	0	0	0	0	0	0	Target Gearing	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Long-Term Borrowing Payable	0	0	0	0	0	0	0	0	0	Actual Gearing	0.83	1.87	3.70	3.31	4.76	6.38	6.38	6.38	6.38
Debtors	26	30	31	30	30	30	30	30	30	Asset Equity Ratio	0.50	0.37	0.26	0.24	0.19	0.14	0.14	0.14	0.14
Tax Payable	0	0	0	0	0	0	0	0	0	Asset Turnover	2.25	1.86	1.75	1.48	1.46	1.46	1.46	1.46	1.46
Dividends Payable	0	0	0	0	0	0	0	0	0	Fixed Asset Turnover	2.86	2.26	2.10	1.72	1.71	1.71	1.71	1.71	1.71
Current Liabilities	26	30	31	30	30	30	30	30	30	Interest Cover	1.73	1.39	1.39	1.06	1.01	0.97	0.97	0.97	0.97
Borrowing Payable after Overhead	0	0	0	0	0	0	0	0	0	Return on Equity	1.30	1.41	1.35	1.06	1.03	0.99	0.99	0.99	0.99
Total Liabilities	26	30	31	30	30	30	30	30	30	Return on Capital Employed	1.00	0.91	0.87	0.66	0.69	0.69	0.69	0.69	0.69
Share Capital	0	0	0	0	0	0	0	0	0	Working Capital Current Ratio	36.04	60.95	126.74	100.52	204.37	253.23	253.23	253.23	253.23
Retained Earnings	1,700	3,443	5,499	7,391	9,044	10,491	11,784	12,960	13,829	FRS Cons. Financial Values	BN/A	BN/A	BN/A	BN/A	BN/A	BN/A	BN/A	BN/A	BN/A
Equity	1,700	3,443	5,499	7,391	9,044	10,491	11,784	12,960	13,829										
Total Liabilities plus Equity	1,726	3,473	5,529	7,421	9,081	10,527	11,819	12,999	13,870										



Service costing

Fully integrated cost-allocation mechanism



Working smarter with the STEM business-case modelling software for networks

Analysys STEM®

- Strategic Telecoms Evaluation Model*
- A consistent language and flexible framework for evaluating investments in telecoms business
- A high-level communication tool which uses icons to represent the key drivers in a business plan
- A time-based revenue, capex and opex calculator which supports network roll-out and investment decisions
- A tailored package of software, training, consultancy and support services

* developed over 20 years with the emerging telecoms economy



Operators and vendors using STEM

- BT Global Services
- Cable and Wireless
- China Telecom
- Korea Telecom
- Mobifon (Connex)
- Mobitel
- Swisscom Mobile
- Telecom New Zealand
- Telkom Indonesia
- Telkom SA
- Alcatel
- Ericsson
- Fujitsu
- Huawei Technologies
- Iskratel
- Juniper
- Marconi
- Motorola
- Nokia
- Siemens



Established modelling process

- In a constantly developing technology environment, there is a real business imperative to perform rapid and reliable evaluations of new service concepts
- Business cases must be readily adapted to changing market conditions and emerging vendor solutions
- STEM manages a complex structure of calculations to help focus on the financial impact of strategic choices
- CANTV (Venezuela), Telkom SA, and leading vendors, including Siemens and Alcatel, are performing detailed NGN studies with STEM
- T-Mobile is using STEM to evaluate the financial impact of technology choices for national and international networks
- BT Global Services uses STEM to calculate direct and fully-allocated unit costs for all the services provided on its regional networks in Europe

Professional modelling tool

The screenshot displays the Analysys STEM Model Editor interface. On the left, a toolbar contains various icons for creating and linking elements. A workflow is shown with 'Service 1' and 'Resource 1' connected by arrows. A context menu for 'Resource 1' is open, listing options like 'Capacity and Lifetime', 'Unit Costs', 'Requirements', 'Capital Cost Structure', 'Cost Trends', 'Deployment', 'Cost Allocation', 'Other Details', and 'User Data'. On the right, several charts are displayed: 'Service Demand - Connections' (line graph), 'Resource Utilisation Ratio' (line graph), 'Revenue, Capex and Opex' (bar chart), and 'Net Present Value' (line graph). The charts show data from 2005 to 2010. The 'Revenue, Capex and Opex' chart shows Revenue (purple bars), Capex (red bars), and Opex (blue bars) in EUR (Thousands). The 'Net Present Value' chart shows NPV in EUR (Thousands) over the same period.

Consistent financial framework

- Service elements capture demand and tariff assumptions \Rightarrow REVENUE
- Resource elements represent unit costs and build constraints for hardware, software, licences, buildings and human resources \Rightarrow CAPEX, DEPRECIATION and OPEX
- Connection, traffic and location-based dimensioning rules are shown as graphical links \Rightarrow PROFITABILITY and BALANCE SHEET



Intuitive graphical interface

The screenshot displays the Analysys STEM software interface with several key components:

- Service Demand - Connections:** A line graph showing demand over time, with values ranging from 12,000 to 18,000.
- Resource Capital Expenditure:** A line graph showing expenditure over time, with values ranging from 50,000 to 350,000.
- Network NPV:** A line graph showing NPV over time, with values ranging from 0 to 80+06.
- Network Diagram:** A central diagram showing connections between various network elements like 'Residential PSTN', 'Business PSTN', 'Small and Medium Businesses', and 'Eight channel base station'.
- Localloop - Selection/Demand:** A table showing demand for different services and connections.
- Localloop - Location/Basic station site plan/PSTN/Interpolated Series:** A table showing location and traffic data.

Year	Residential PSTN	Business PSTN
1997	3.45e+05	4.17e+05
1998	8.93e+05	1.07e+06
1999	4.67e+05	5.56e+05
2000	0.00	0.00
2001	0.00	0.00
2002	384.19e3	5.281.21e3
2003	28.402.2	91.422.4
2004	0.00	0.00
2005	0.00	0.00
2006	8.93e+05	1.07e+06
2007	4.67e+05	5.56e+05

Year	Call Minutes	Call Minutes
1997	1.15e+05	1.39e+05
1998	1.83e+05	2.76e+05
1999	0.00	0.00
2000	0.00	0.00
2001	0.00	0.00
2002	59.000e3	9.93e+05
2003	1.03e+06	2.39e+06
2004	5.3e+05	1.1e+06
2005	4.93e+05	5.21e+05
2006	7.16e+05	1.96e+06
2007	9.93e+05	1.03e+06

STEM integrates communication with calculation

- Provides a brainstorming and presentational tool for rapidly developing network business models
- Automatically generates demand / cost-allocation formulae, geographical variants and scenarios
- Calculates annual, quarterly and monthly service connections, traffic and revenues, equipment installation and replacement, capex and opex
- Delivers hundreds of built-in results through an integrated charting interface which can drill-down into individual elements, revenues and costs



Business cases by design

- Business-case models are typically built from the bottom-up each time in Excel:
 - laborious re-working of basic calculations
 - scope for copy errors; slow handover
- STEM wraps up core elements of telecoms business planning, enabling rapid and reliable, same-day development of business cases
- Consistent structure and graphics act provide a common language across business groups

STEM business-modelling software for networks

STEM User Group Meeting

- 20-21 September 2006, Clare College, Cambridge, UK
- Interactive sessions on business planning for convergent services and product-profitability analysis
- Master classes for established users in parallel with fast-track training for newcomers
- Guest presentations from operator and vendor clients



Please register by email to stem.admin@analysys.com

 **Analysys**

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STEM® business-case modelling software for networks
www.analysys.com/stem/

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