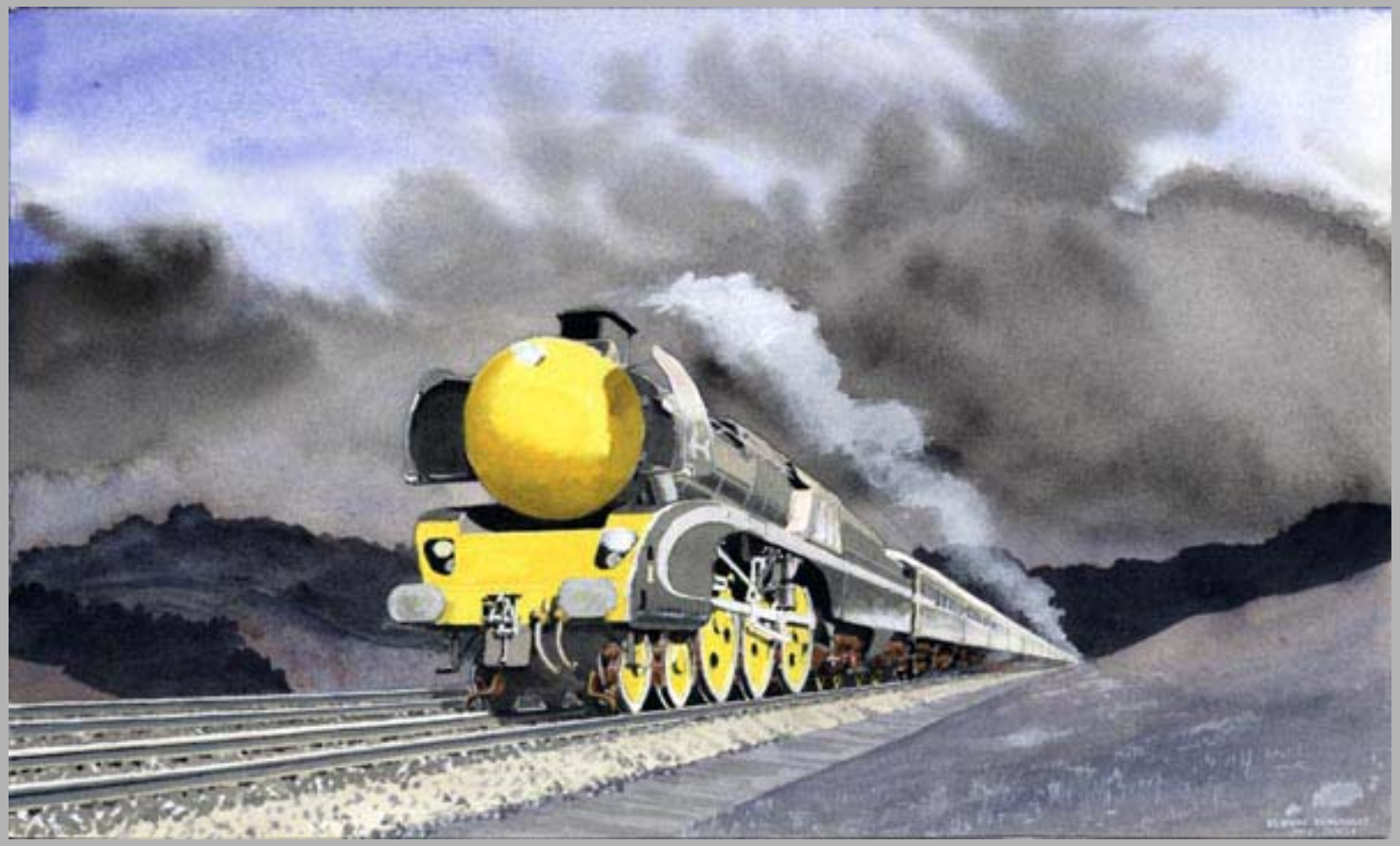
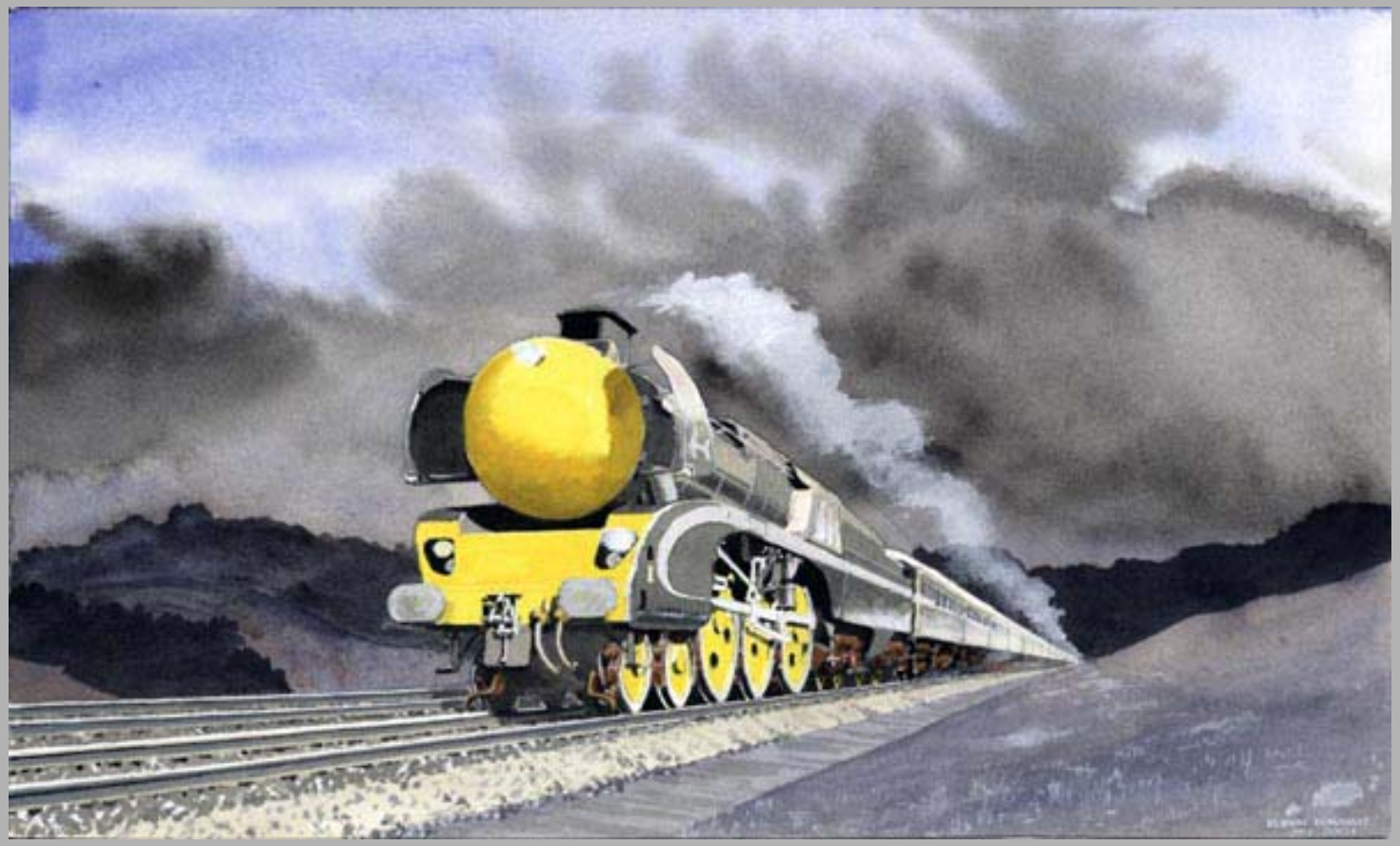
Making the commercial case for the 5AT



The 5AT – modern steam for modern rail

The “Red Devil”

Making the commercial case for the 5AT



The 5AT – modern steam for modern rail

What? Why? How? When?

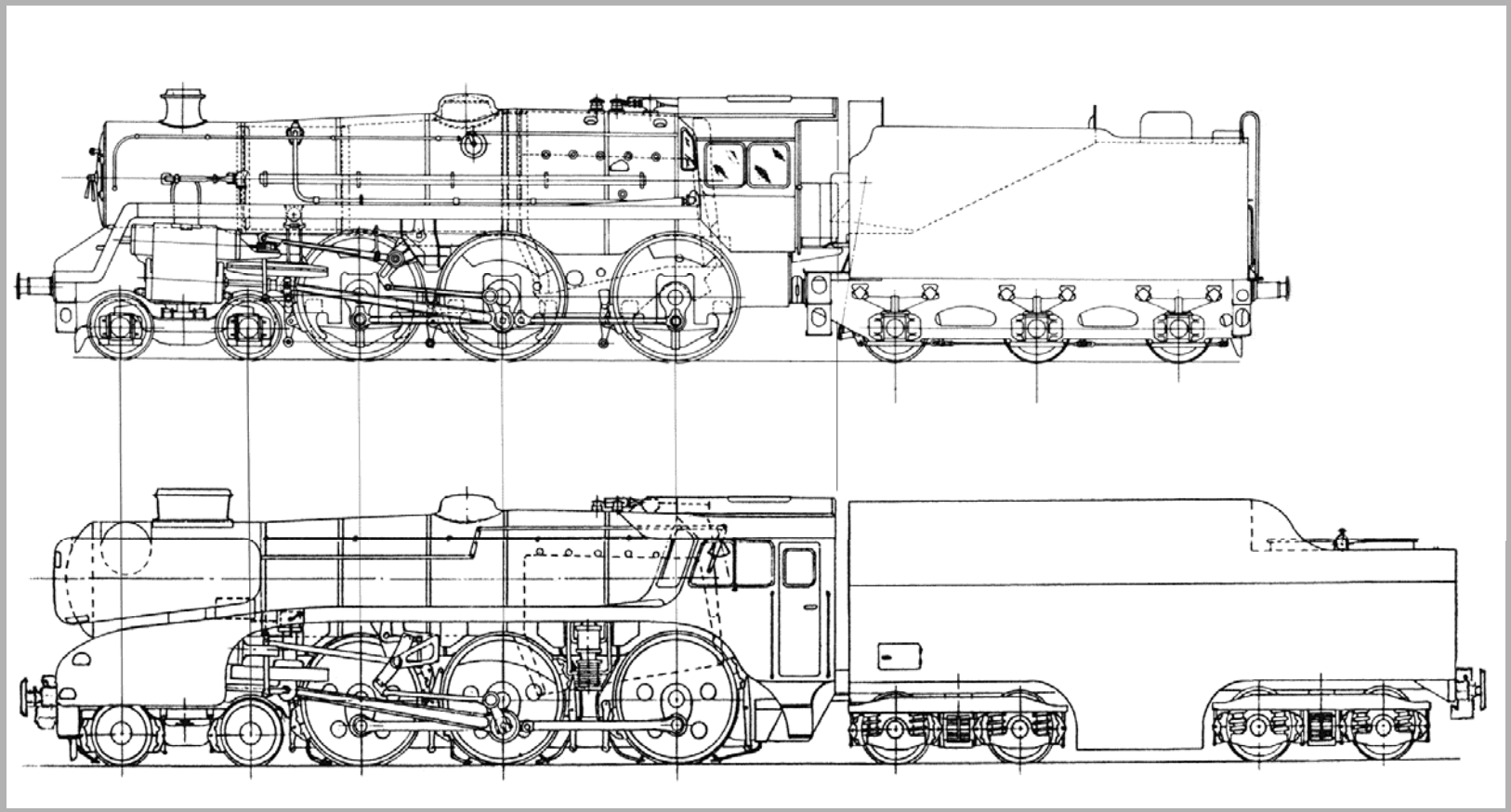
- **What** is the 5AT?
- **Why** develop the 5AT?
- **How** can a commercial case be made for the 5AT?
- **When** can we expect to see the 5AT in operation?

What is the 5AT?

The 5AT is a proposed advanced technology “second generation” 4-6-0 steam locomotive for hauling premium, charter, rail cruise and tourist trains in the 21st Century.

- incorporates the latest steam locomotive technology as developed by Chapelon, Porta, Wardale and others.
- Evolved from the ex BR Class 5MT 4-6-0
- Designed to have a performance which will enable it to keep up with line traffic speeds on modernised rail networks.

5MT and 5AT compared



The 5AT

5AT design features

Maximum speed 200 km/h (125 mph)

Continuous operational speeds up to 180 km/h (113 mph)

Drawbar power – 2550 h.p (130 km/h, 81 mph) on level

Overall drawbar thermal efficiency around 14%

Light oil (diesel) fired though possibilities for coal fired version

Long range (610km/380 miles water/920km/575ml fuel)

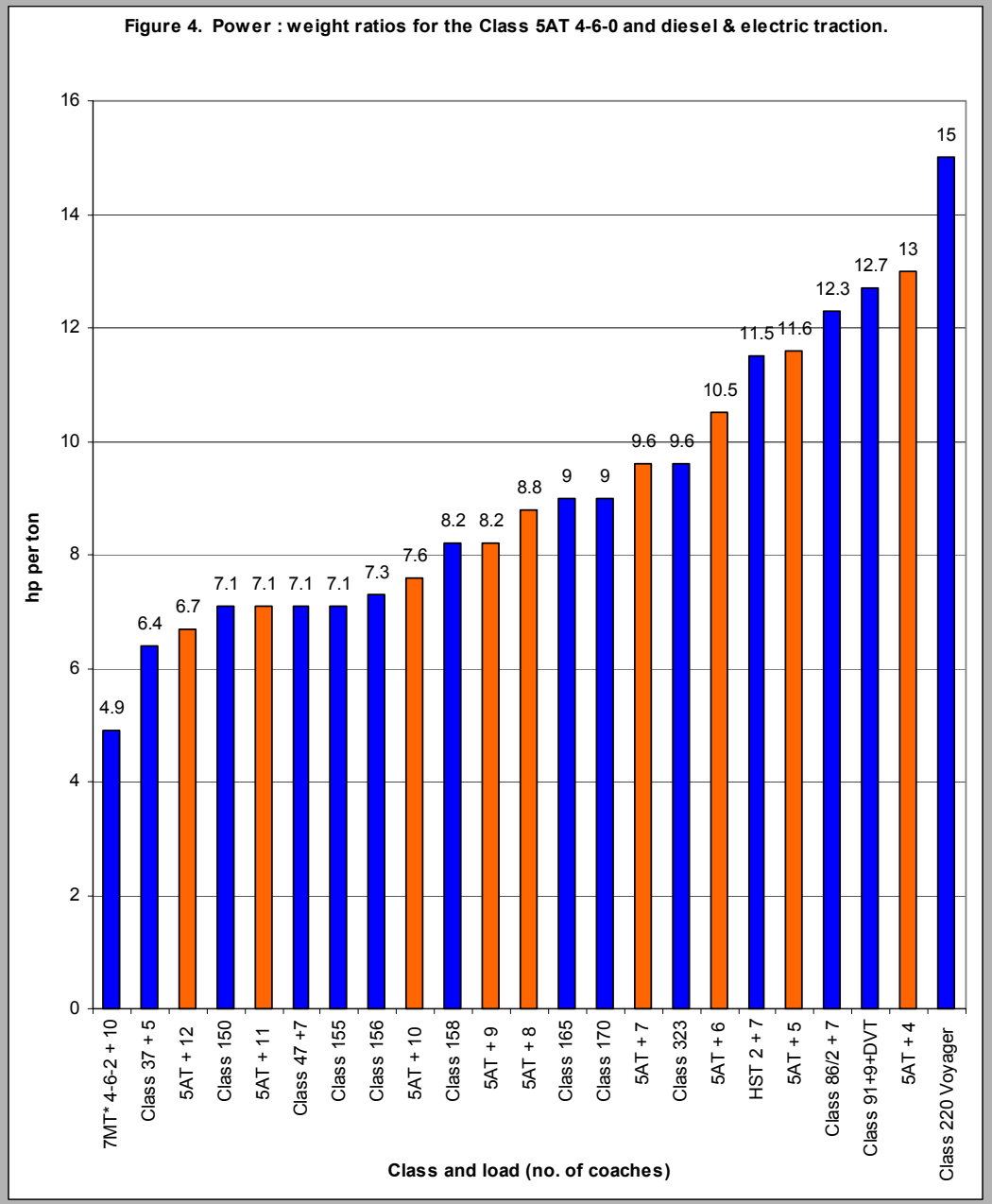
High reliability

Low maintenance costs/low operating costs

Good adhesion

York 1962

Figure 4. Power : weight ratios for the Class 5AT 4-6-0 and diesel & electric traction.



Why develop the 5AT?

To ensure that steam has a long term future on the main line.

To make a commercial return for its operators.

To demonstrate the main-line possibilities of modern steam.

To ensure main line steam locomotive development continues.

How can one make a commercial case for the 5AT?

Stage 1:

Estimate the likely cost of developing and building

Current cost estimate £3.5 million.

(€5.0 million, $5.7 million)

Composition

£3.5 million cost includes:

- Design engineering and drawings
- Project Administration & Supervision
- Building costs (subcontracted)
- Liaison with rail & regulatory bodies
- Testing
- External costs of vehicle approval

Subsequent 5AT locomotives

- Anticipated cost £1.5 million
- “Development Overhead” for initial locomotive thus approx £2.0 million (i.e. £3.5 million - £1.5 million).

How can one make a commercial case for the 5AT?

Stage 2:

Design a spreadsheet business model to ascertain whether the 5AT can be commercially justified.

(The model should allow values to be entered for different parameters to ascertain potential returns from the 5AT under different operating conditions).

5AT business model

Estimates potential returns over the anticipated life of the locomotive (30 years approx).

1. With locomotive operated on a “hired-out” basis.

2. Computes anticipated “ball-park” profits of various types of 5AT-hauled train.

Assumptions as variables

Proposed 5AT steam locomotive - Overall summary projections from acceptance

Assumptions:

Funded on a Loan Basis		
Locomotive completed in 7 years from start of project.		
Further 6 months required for test/acceptance		
Inflation:	2.50%	average year on year increase
Interest @	5.00%	above inflation
=	7.50%	average per annum
Loan Repayments =	45%	of annual revenue
Loco amortised over:	30	years
Build cost	£2,400,000	at year one values
£1,100,000	engineering cost written off as incurred.	

Avg. number of trips	156	charter trains/annum
Avg. hire charge per trip	£3,200	at year one values
Avg. Direct Costs per trip*	£600	at year one values
(excluding Crewing costs)		
Average Trip Length	200	miles
Maintenance Cost	£0.50	per mile at year one values
General Overhaul every	250,000	miles
General Overhaul takes	3	months to complete
Overhaul cost	£200,000	at year one values
Annual Admin. costs	£50,000	at year one values

Hire charges and costs increase in line with inflation.

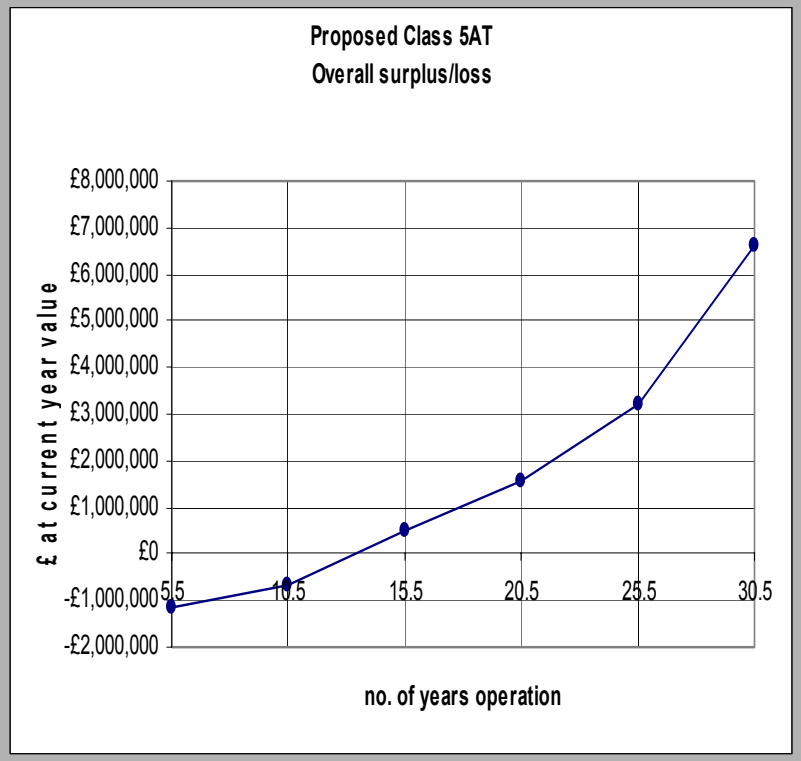
* Superintendence, Insurance, Lubricants

Conclusions from model

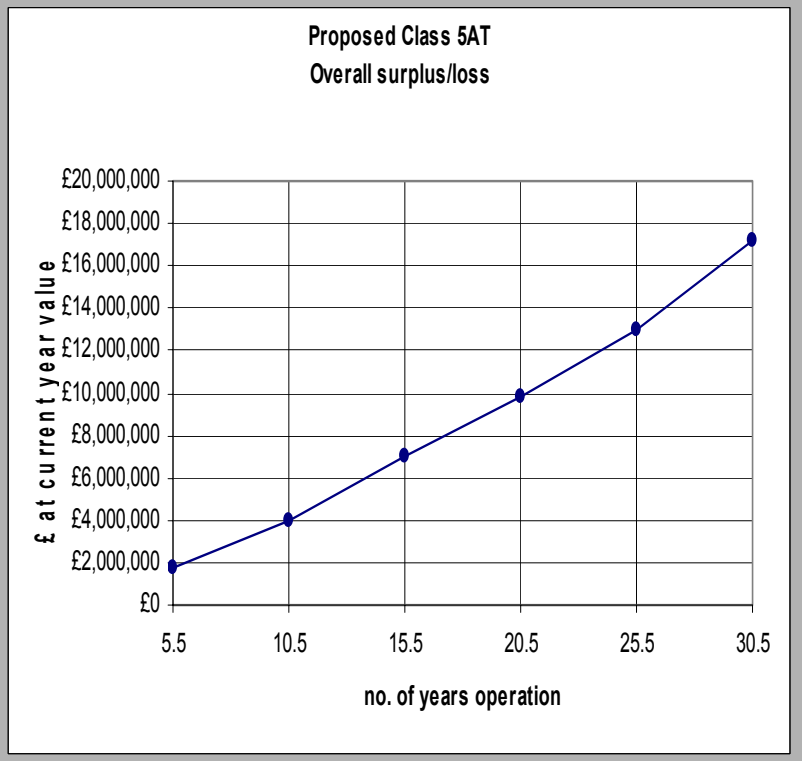
- The 5AT will need to be operated much more intensively than “heritage” steam locomotives if it is to be commercially justified.
- If the development overhead – i.e. the design and prototyping costs - can be separately financed returns can be attractive.

Effect of defraying development O/H by sponsorship

Development fully amortised on first loco



Development financed separately



Assumptions: finance for loco purchase raised through loans at 5% above inflation.
average annual number of hires per year – 156
average trip length 320 km. (200 miles)

5AT hauled trains

The business model also attempts to estimate "ball-park" annual pre-tax profits of running different types of 5AT hauled trains:

1. Premium scheduled/luxury dining train.
2. Mixed 1st Class dining/standard class train
3. Standard class train

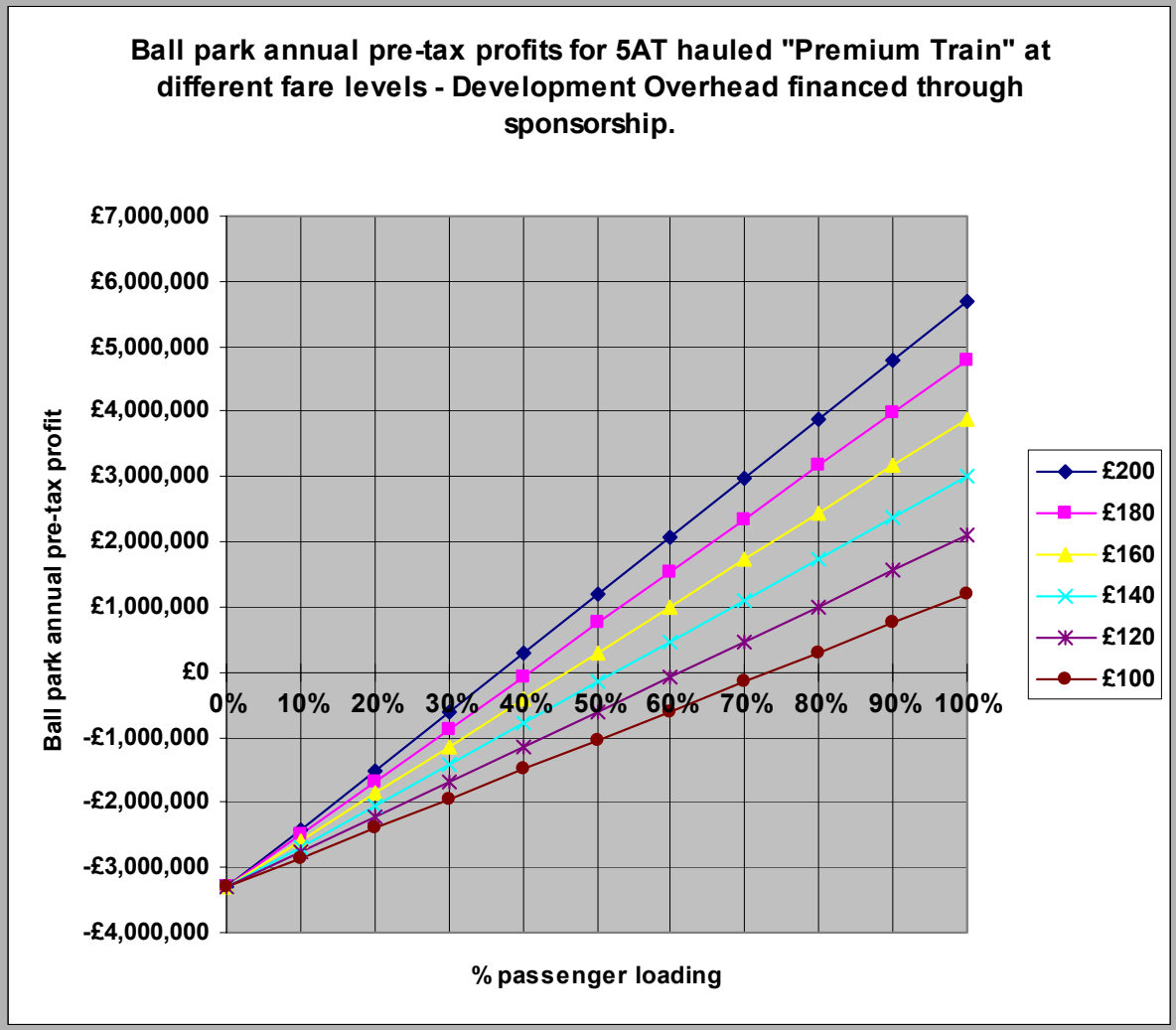
“Ball park” estimates

Assuming:

1. The initial 5AT locomotive operates a regular itinerary.
2. It hauls 156 trains a year on an average 320km/200mile journey with an average passenger loading factor of 60%.
3. The 5AT and its train are leased by a train operator.

The indications are that all three types of train (Premium, Mixed and Standard) could generate attractive profits especially if the development overhead can be financed by sponsorship or by other means.

“Ball park” profitability of premium train



When can we expect to see the 5AT in operation?

Estimates made for the 5AT business plan indicate that the initial 5AT could be designed built, tested and accepted within 7½ years of the start of detailed design work.

(Assumes that the necessary finance would be made available at the appropriate times).

All the work we have done so far indicates that the 5AT can be both technically and commercially successful .

Major keys to commercial success

- Gaining appropriate finance to design & build loco.
- A motivated and skilled project team
- Good Quality and Project Management
- Project completion within timescale & budget
- Regular operation
- Performance as per specification
- Very high reliability
- Optimum passenger numbers
- Appropriate fare structures.
- Customer satisfaction

Prospective users of the 5AT

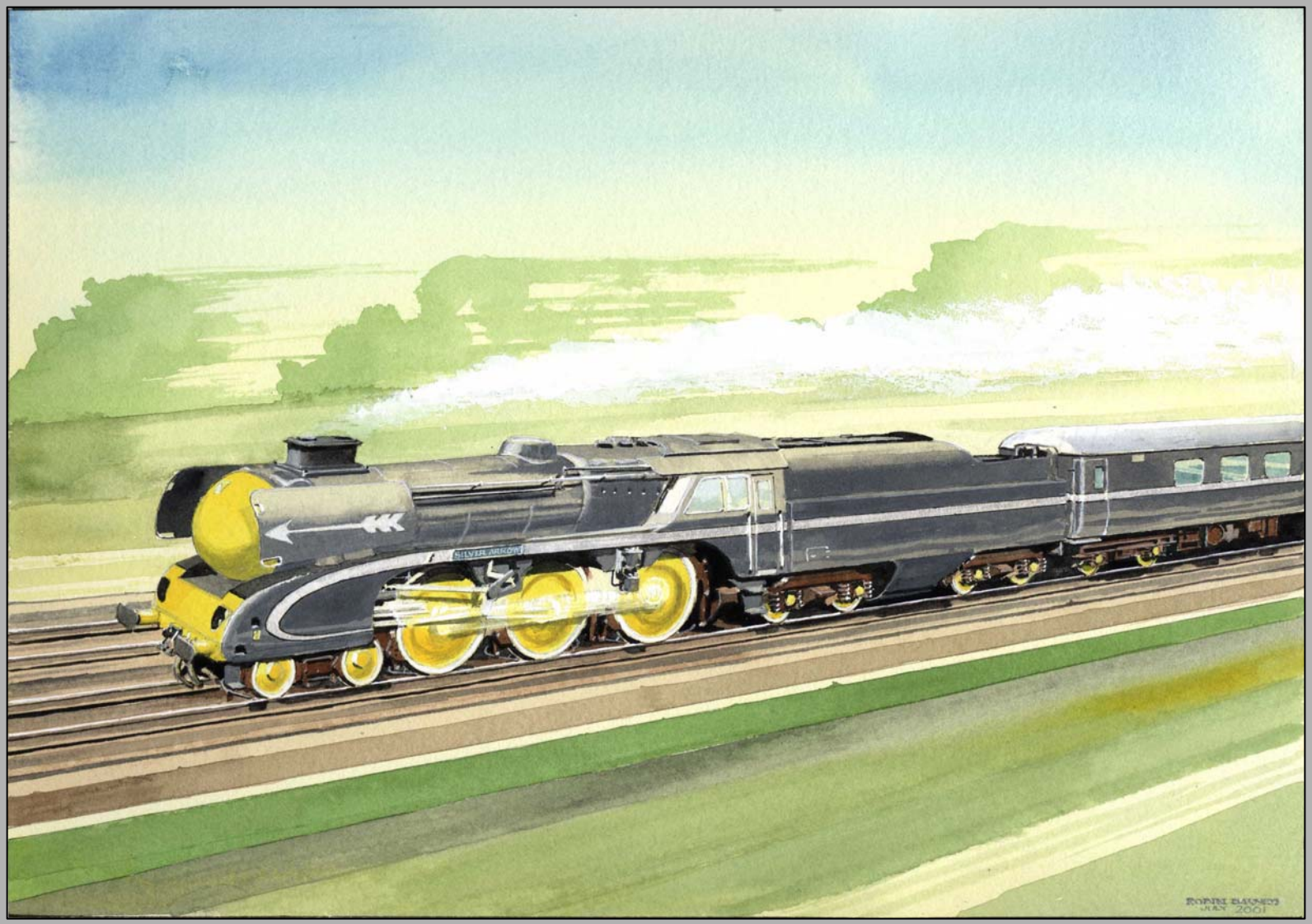
- Train Operating Companies
- Major Leisure Travel Companies
- Charter Train Operators
- Possibly other types of organisation

And finally another question……

"Are we willing to allow main line steam locomotive development to end exactly 200 years after the first steam locomotive was built?"

The 5AT group are of one mind in saying a loud **NO** to this question!

The 5AT – modern steam for modern rail



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