Overview

The BusinessSpace Automated Services (BAS) system *mission concept* is illustrated on the opposite page. The BAS system is one facet of the wide area networks for Automated Meter Reading (AMR) being implemented by many utility companies providing electricity, gas and water to the public. AMR is becoming increasingly important in managing the huge and complex production and delivery systems for these basic commodities in modern deregulated markets. The energy suppliers are the *users* of the AMR information.

The mission *subjects* are a widely distributed ground-based population of up to three million satellite communication terminals used to collect AMR data from electrical, gas and water meters. The communications terminal is integrated together with an electricity meter located in a remote "hard-to-read" industrial location.

Periodically, a satellite carrying the BAS communications *payload* passes overhead. The payload polls the terminal by signalling over a radio link the command to upload the metering data contained in the memory of the terminal. These data are then transmitted by the terminal, received at the satellite, reconstructed into binary messages and stored in on-board memory. The satellite and payload constitute the *space segment* of the BAS system. The BAS space segment is an orbiting fleet of six satellites when fully implemented after five years. Subsequent growth would bring the fleet up to twelve satellites.

At the appropriate time in its orbit the satellite passes over one of our ground stations which together with one satellite control centre and three customer service centres compose the *ground segment* of the BAS system. Payload and satellite housekeeping data are transferred from the satellite to the ground station which distributes these data to the customer service centres and the satellite control centre. The earth stations and service centres are located in Europe, North America and Asia-Pacific.

The service centres regionally co-ordinate the delivery of the data to the user, and organise the customer requests for AMR data. Customer requests are transformed into AMR orders forwarded to the satellite control centre in Europe, which is then responsible for constructing the AMR terminal polling sequence and controlling the fleet of satellites.

BAS is a commercially viable system designed by a team of eighteen international professionals both generalists and specialists with over 150 years of combined experience in the field of space engineering. In 7500 man hours of effort our team has delivered a unique design concept which has optimised the overall system for an *application specific mission* addressing a narrow niche in a broad market. The end-to-end approach exercising all aspects of space system engineering is tied closely to cost constraints derived from the basic business case.

The result comes through in the low cost approach to the design of the satellite and the payloads especially in the secondary remote sensing mission payload. Our remote sensing team has worked under very tight cost constraints to deliver a low cost, low weight demonstration payload. They have designed an optical device which can deliver stereo images at 15 meter resolution at one-tenth of the conventional costs. Our approach to spacecraft design is cost effective by using existing space qualified components put together with minimum manufacturing effort. Our engineering philosophy is based on sound concepts allowing a short spacecraft production cycle and avoiding risky technologies.

This unsolicited proposal is a summary of the results of our Central Case Project. In the spirit of the market-oriented approach applied at SpaceTech to space systems engineering, it is intended as a practical exercise in communicating our space mission to a *commercial* audience. In terms of engineering content, it is a mere shadow of the extensive treatment contained in the Project Book and the Systems Engineering Package, documents which have been delivered to TopTech Studies and TUDelft for formal scholastic evaluation. Readers interested in the engineering logic and the technical details are encouraged to consult those sources.