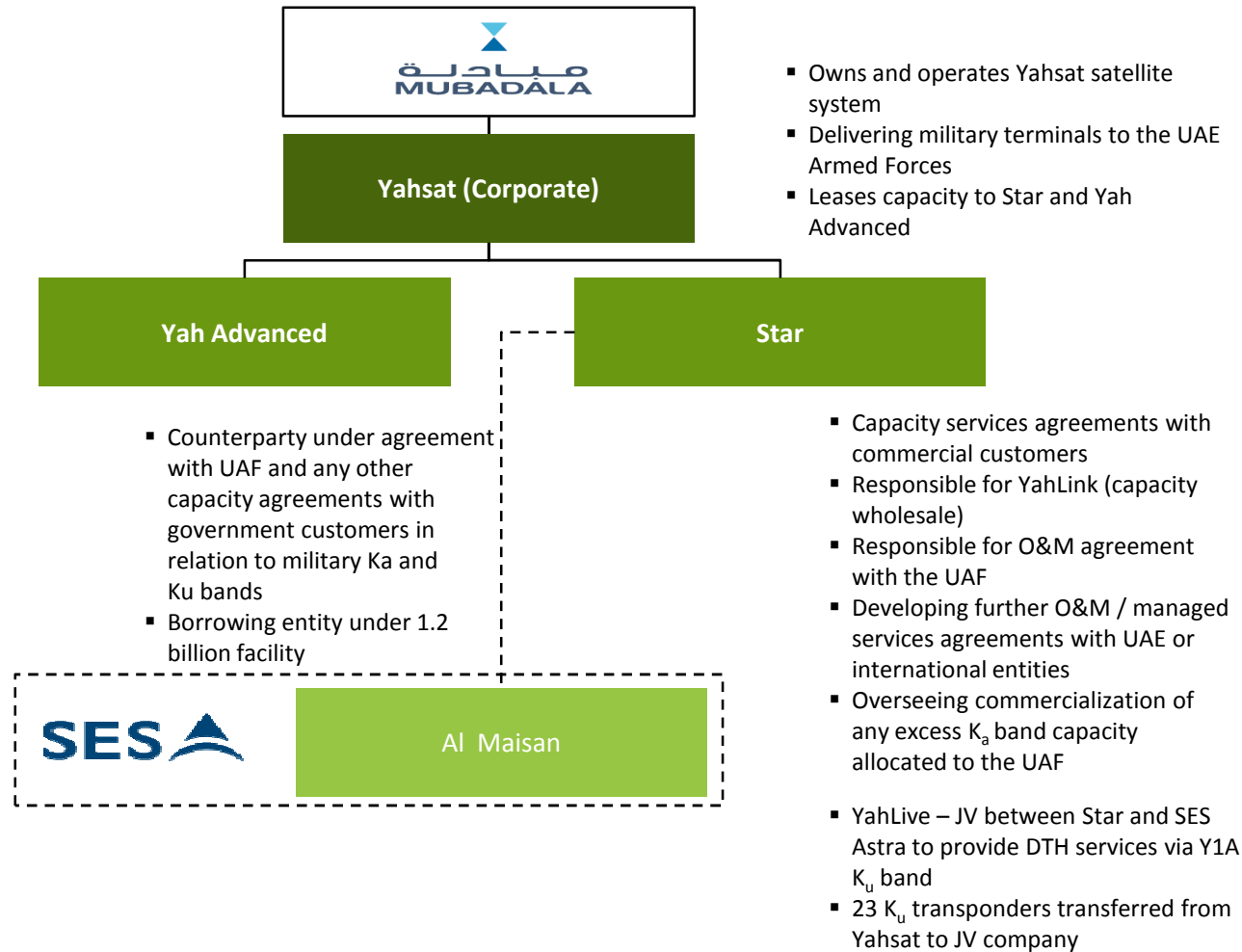


Satellite Program - Technical and Risk Considerations from a New Operator Point of View






Martin Gee - Yahsat CTO

Yahsat Ownership Structure, Subsidiaries &

JVs

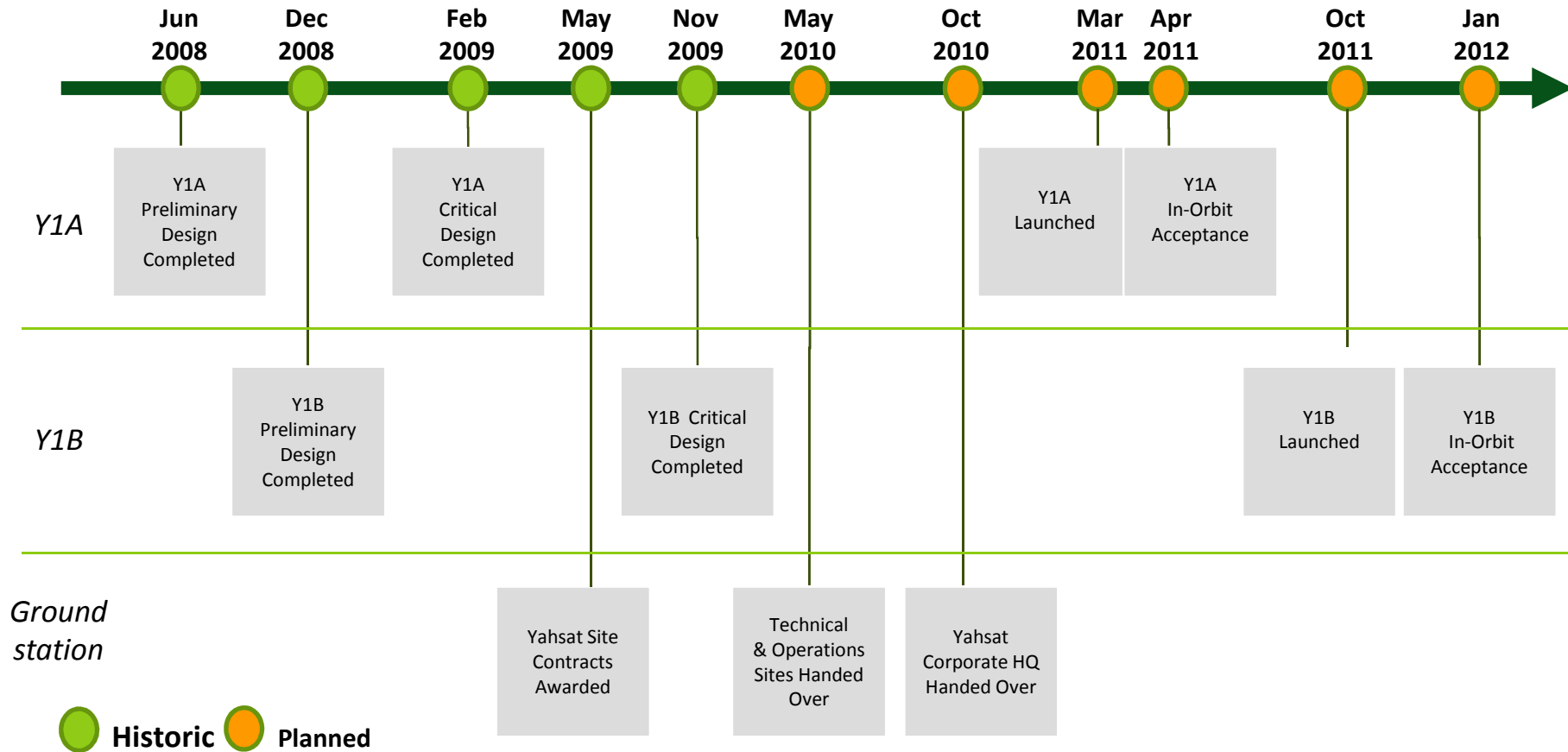


Yahsat's Product Portfolio

	Government	The first highly secure and reliable satellite service on military K _a -band in the region
	Broadband	High speed, cost-effective internet using commercial K _a multi-spot beam technology
	Connectivity	High power C-band capacity via a single beam over Middle East, Africa and Europe
	Broadcasting	Ku band capacity for broadcasting services, with highly flexible switching capability
	End-to-End Solutions	Value added services that enable Yahsat to cater to needs of clients requiring end-to-end solutions and managed services

Yahsat offers a wide range of satellite services to meet all the major market requirements

Key Technical and Operational Milestones



Yahsat Satellites Currently Under Construction

Y1A



Contractor: EADS Astrium & Thales Alenia

Planned launch: Q1 2011

Orbital location: 52.5°E

Lifetime: 15 years

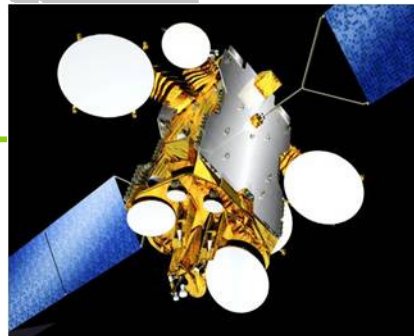
Launcher: Ariane 5

Capacity/payload:

C-band: 8 x 36MHz + 6 x 54MHz transponders

K_v-band BSS: 25 x 33MHz transponders

K_a-band Military: 21 x 54MHz secure transponders



Y1B

Contractor: EADS Astrium & Thales Alenia

Planned launch: Q4 2011

Orbital location: TBD

Lifetime: 15 years

Launcher: ILS Proton

Capacity/payload:

K_v-band Commercial: 25 x 110MHz transponders (56 spot beams)

K_a-band Military: 21 x 54MHz secure transponders



Dubai 1-3 March 2010

Stake Holders

- Mubadala
- Abu Dhabi Government
- UAE Armed Forces
- Lenders
- Customers
 - Capacity lessees
 - Service Providers
- JV partners e.g. SES
- Broadband Ground Segment provider – ViaSat
- Insurance Underwriters

Business Risk Mitigation

- Close cooperation with customers during the mission design phase to ensure the provision of optimum services
- Y1A/Y1B mutual in orbit back-up for key mission
- Secure launch schedule - Dual launch compatibility maintained with Ariane and Proton until late decision point for Y1A
- Customer Contracts allow margin for potential delays – Hence do not “drive” the program schedule
- “Special Contractual” provisions for ground segment
- System Acceptance – Key Contractual Provisions
- Space Insurance:
 - Launch plus one year
 - In-orbit

Technical Risk Mitigation

- Heritage
 - Minimising risks is key to the industry, but particularly important for a “new” business venture.
 - Ensure maximum Equipment Heritage
 - Ensure no critical first flight items
 - Detailed Reviews and Test Programs for “system risks” during procurement phase
 - Mature operating systems and procedures
 - Technical visibility to work - ITAR issues
 - Proven multi-launch system heritage for program configuration
 - Engagement of proven experienced staff for key functions

Technical Risk Mitigation

- Quality
 - Comprehensive test program; Test Plan defined in Contract
 - Environmental testing
 - Payload System Complexity increasing - Must ensure not over tested - Mech. Environment testing performed after launcher selection.
 - System Margins specified
 - Power - (10% Solar Array EOL-W/C, Battery DOD 72% W/C, TDMA,.....)
 - Propellant – (Life >2yrs margin, Plasma with Bi-Prop back-up for N-S,....)
 - Redundancy and qual life margin
 - Qualification Requirements
 - Protoflight Model philosophy (margins defined)
 - Extensive use of QM's and EQM's (in spite of heritage!) (System interfaces, change of facilities, mission critical equipment...)
 - Complimentary mission related test programmes – Specific equipment (e.g. ADTM, Dual EPC...)
 - Parts Materials and Processes – Comprehensive definition of standards and requirements
 - Equipment

Technical Risk Mitigation

- Monitoring
 - Consultant experience specific to technology essential
 - Consultants Contractually “accountable”
 - Well staffed resident offices
 - Ensure that industry maintains residents at key suppliers
- Contractual Schedule
 - Key that satellite schedules allow adequate time
 - Y1A: 34 months nominal
 - Y1B: 41.5 months nominal
- Contractual
 - Obligations to notify any issues and incorporate lessons learnt
 - Obligation to provide “Insurance Certificate”
 - Ground system Warranty
 - Manpower support in Control Centre for one year, plus Operational Support over life
 - Penalties-Incentives

Launch Services

- Launch Service Considerations
 - Successful successive prior launches
 - Hardware configuration heritage
 - Performance
 - Quality reviews and reporting
 - Schedule track record
 - Commitment to meet a requested launch date

Conclusions

- Heritage in all technical areas - essential
- Comprehensive test programs
- Ensure system margins maintained (power, thermal...)
- Experienced staff for key functions (technical management, procurement, operations...)
- Comprehensive training programs
- Program residents in industry
- Ensure schedule does not compromise quality

Thank You



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MARTIN S. GEE - CV

- Martin S. Gee is the Chief Technical Officer, Yahsat, an Abu Dhabi based satellite communications company. Yahsat is the first hybrid (commercial and military) satellite communication system to be launched in the Middle East.
- Martin has over 30 years of experience in various aspects of satellite communications systems. In his current role, he leads and manages the overall technical responsibilities of Yahsat. He is responsible for all engineering and technical activities within the company including procurement, operation of the Space Segment and Ground Segment Systems to ensure continuity of the communication services. Martin is in charge of ensuring high performance and reliability of the technical services offered to Yahsat's customers, while taking full account of market availability, pricing, capacity, performance, service levels.
- Prior to Yahsat, Martin was responsible for the Satellite Engineering and Procurement for Eutelsat, where he directly supervised all technical and management activities of the Eutelsat satellite programmes.
- He has previously worked with ESTEC, Bell Telephone Manufacturing Company and Marconi Space Defence in various roles.
- Martin holds a Bachelors degree in Physics and is a member of Institute of Electrical Engineers and is a Chartered Engineer and Chartered Physicist.
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Yahsat Background and Vision

Background

- The concept behind Yahsat was introduced several years ago to cater for essential government and growing commercial satellite communication requirements
- Yahsat project resulted in the design of the region's first hybrid satellite system to provide customized satellite solutions for the government as well as the commercial sector in the Middle East, Africa, Europe, South West Asia and the Far East
- Upon incorporation in January 2007, Yahsat signed a \$1.66 billion turnkey contract with EADS/Thales Alenia Space for two satellites (Y1A and Y1B) with their related network management systems and the ground segment
- UAE Armed Forces signed a 15-year Launch Customer Agreement with Yahsat for a full satellite communications network and network control center and related satellite ground terminals
- Hybrid System provides comprehensive Commercial Services including DTH, V-SAT, Multi spot Broadband
.....

Vision

“To be the leading satellite communications operator in the region, through its optimum user solutions and partnership approach.”