SubOptic2013 from ocean to cloud

MASTERCLASS TUTORIAL 4

The Thin Route Environment

Presenters: **John Hibbard (Hibbard Consulting)**

Maja Summers (Apollo SCS)

Presenter Profile

John is based in Sydney. After 38 years with Telstra, John set up his own consulting company. In the past decade he has focussed on international communications, particularly submarine cables.

John has been involved in the APNG2, ASH, SAS, Honotua, PPC1, Tonga-Fiji, Interchange and SOCC cables

John was President PTC for 2009-2012 and is now a Board Member

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Presenter Profile

Maja has been with Apollo SCS since 2009, initially as the Operations Director and since recently as the Sales & Marketing Director. Prior to joining Apollo Maja was the Head of the Submarine Systems Engineering team in Cable & Wireless. In that role Maja was involved with the design, implementation and operation of a number of private and consortium submarine cable systems

- Maja Summers
- Sales & Marketing Director, Apollo
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What We'll Discuss Today

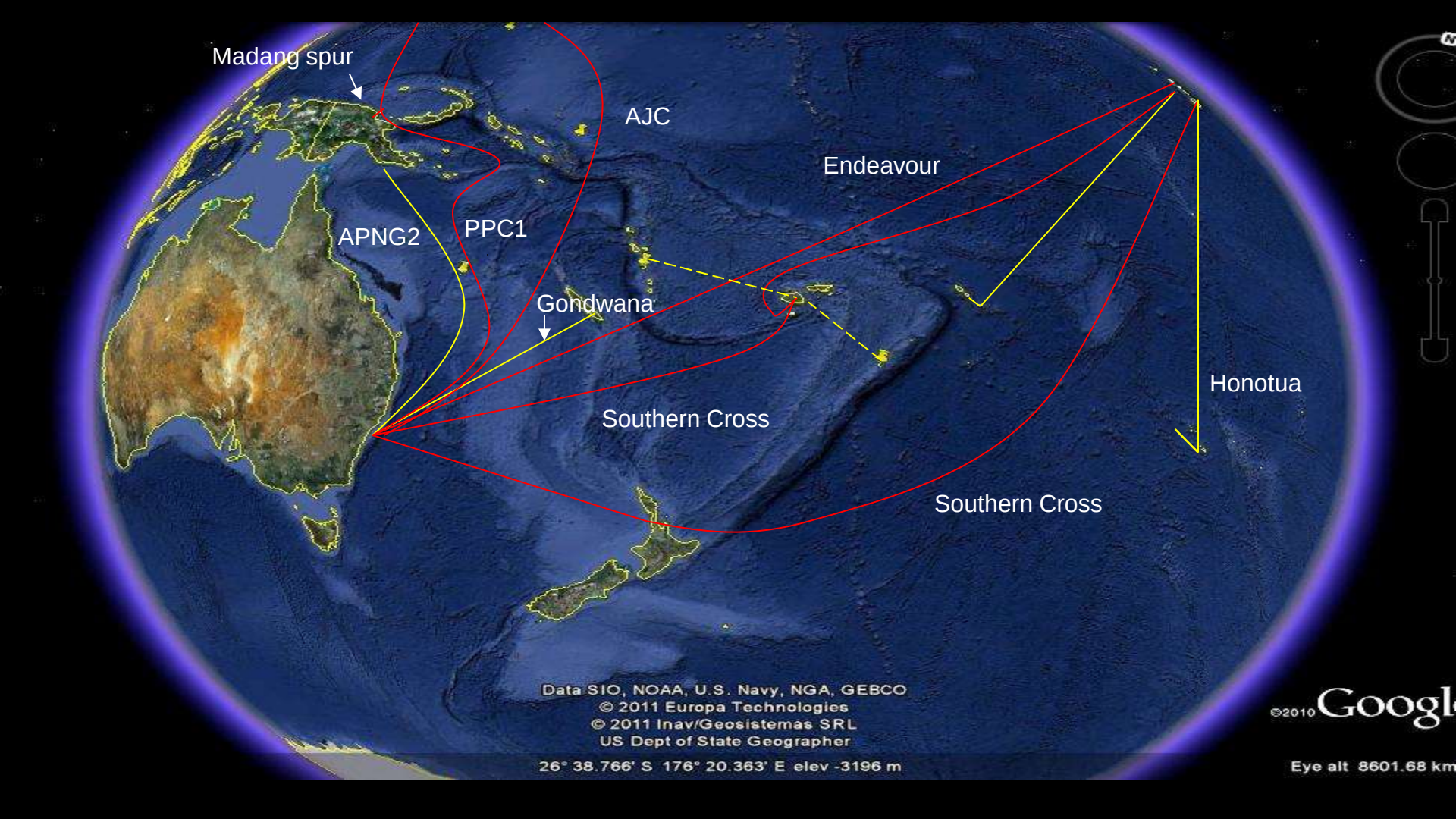
1. SETTING THE SCENE
2. BUILDING THE CASE
   A. TECHNICAL ELEMENTS
   B. COMMERCIAL ASPECTS
3. IMPLEMENTATION & OPERATION
4. DISCUSSION

What's a Thin Route

- Low capacity typically < 20 Gbps
- In South Pacific, currently 55,000 kms of cable, of which 15,000 are thin route
- In the Indian Ocean south of Mumbai, Red Sea, currently 60,000 kms of cable of which 8500 are thin route

Characteristics

- Single/first international cable from a country (“umbilical cord”)
- Could be domestic cable or festoon
- Small population countries/centres, often remote
- Tired of high priced, lower quality satellite
- International cable to a point where internet access possible
- Limited availability of capex, opex, customers


Madang spur
AJC
Endeavour
APNG2
PPC1
Gondwana
Honotua
Southern Cross
Southern Cross
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
© 2011 Europa Technologies
© 2011 Inav/Geosistemas SRL
US Dept of State Geographer
26° 38.766' S 176° 20.363' E elev -3196 m
©2010 Google
Eye alt 8601.68 km

Developing the Business Plan

- Developing the business plan
  - Identifying the demand forecast (capacity requirements day one and long term)
  - Identifying the capacity price
  - Postulating a route and cost of build
  - Assessing the O&M alternatives and cost
  - Assessing the potential return
  - Analyse ‘do nothing’ alternative

System Design Parameters

Main Options:

- Dedicated cable
- Spur of another cable

Main Considerations for the low capacity design

- What are the limitations introduced by the low capacity design?
- What is trade off between the savings made vs the limitation introduced?
- Can those limitations be removed with future technology advances?

Dedicated cable – New build

- Cheaper cable – less protected cable will potentially bring large opex cost due to frequent faults if used in hostile area
- Fewer repeaters – thin routes by design will have smaller capacity requirements, design with repeaters spaced as far apart as possible is unlikely to have an impact
- Longer reach unrepeated system

Dedicated cable – New build

- Cheaper terminal equipment – Given that this is probably the only cable on that route removing equipment protection is not always the right choice.
- PFE options
- Can redundancy be added at a later stage?

Dedicated cable - redeployed

- What is the highest cost component in the submarine system build?
- In the case of redeployed cable compare the cost of cable recovery and transfer vs cost of new build cable and transfer
- Location of the cable that is available for redeployment; Availability of cable ship installer to recover and redeploy.
- How can it be acquired? What elements of the donor system can be reused?
- What technical expertise is available for project planning? This is required to make the project successful

Cable redeployment

Commercial considerations:

- Warranty – original supplier warranty is not available. If additional submerged plant can be recovered for extra spares it can mitigate the lack of warranty. Reliable donor system may bring no disadvantage.
- Timescales – compared to standard lead time for new cable build timescales for cable recovery are often better, assuming good vessel availability. Timing on recovery is flexible, as cable is always available.
- Risk – different risk profile when compared with new build, mainly related to the integrity of the donor cable and lack of warranty.
- System design life

Cable Redeployment

Technical Considerations:

- Submersible plant: Reliability and fault history of the donor system; Cable integrity after recovery; Can the donor system be tested prior to recovery; Donor system cable type, fibre type, repeater type.
- Transmission performance; Maximum capacity achievable; Desired system capacity and configuration.

Cable Redeployment

When it would not work:

- The type of the donor cable is not suitable – fibre types, repeater spacing, cable type
- The geographical locations of the donor cable in comparison with the new system – long transit after cable recovery would introduce high additional cost
- Condition of the donor cable not good
- The cost saving is too small

Spur off another cable

- Reasons for introducing the spur
- BU type
- Optimisation of the branch design to achieve the most cost effective solution
- O&M arrangements

Spur off another cable

Spur off another cable

- New BU on new cable with spur – needs to be planned from the outset
- New spur on stubbed BU – already included in the design, and therefore a simpler solution
- New BU and spur on existing cable – not planned from the outset; what is the optimal design.

Funding Thin Route Cables

- Ownership Structure
  - Consortium, however limited carriers
  - Incumbent carrier
  - Government ownership (part/whole)
  - Provident fund
  - Private entrepreneur
  - Mixture

Funds

- Equity
  - Few carriers have capacity for all equity
  - Partial equity, some debt
- Pre-sales
  - Limited funds, PAYG schemes
- Sources of Debt
  - Commercial banks
  - Provident funds
  - Government loans
  - Development banks (World Bank, ADB, EXIM, etc) – low interest potential

Issues and Challenges

- Limited pre-sales
- Perceived Sovereign risk
- Interest rates and bank fees
- Development bank processes
- Banks sceptical of demand forecasts
- Decisions made by those remote from location

Bright spots

- Increasing experience of the stimulus
- Recognition of importance of good comms
- Dev banks have difficulty finding projects which will help economic development
- Cables fit the regional allocation
- Well suited to NPFs because generates development and wealth
- Growing evidence that it can help the well-being of a nation

Pacific Cable Stimulus

Cable1	Routing	Demand prior to RFS	Capacity shortly after RFS	Capacity
APNG2 then PPC1	PNG - Australia	22 Mbps	45 Mbps (2007)	800 Mbps
Gondwana	New Cal - Australia	150 Mbps	450 Mbps (2008)	3000 Mbps
ASH	Pago - Hawaii	35 Mbps	90 Mbps (2009)	500 Mbps
SAS	Apia - Pago	15 Mbps	45 Mbps (2009)	135 Mbps
Honotua	Tahiti - Hawaii	500 Mbps	1500 Mbps (2010)	4000 Mbps

RFT Development

- What's different?
- Looking for creative thin route solutions. Don't need a terabit/sec
- Solutions that keep costs down
- However may need to comply with DB requirements
- Can be limited scope for judgement, negotiation
- Spurs off BUs present particular issues

Pricing & Pre-selling

- Setting a price
  - Better than satellite at start
  - Substantial volume discounts
  - Need to recognise capacity to pay vs need for upfront money to fund cable
- Selling
  - Early bird discounts

Products

- Leases (Minimum 45 Mbps)
- IRUs (min STM1)
- Financed IRUs
- Lease converting to IRU
- Ethernet

Competition

- GEO satellites
  - $1500 - 2000 per simplex Mbps/month
  - Equates to $2000+ for cable equivalent
  - Significant latency
  - Limited capacity at times
  - Subject to weather, sunspots, etc

Competition

- O3B
  - Still to fly – due for service in Oct 2013
  - Transponder will carry about STM4 equivalent
  - Cost for full transponder believed about $600-$800 per cable equivalent Mbps/month
  - Higher with less than full transponder
  - Lower latency than GEO, near cable
  - KA band, rain performance unproven

Setting the price

- Now needs to start at $1000 or less (on a lease basis)
- Significant volume discounts
- $600 for a STM4
- $400 for a STM16
- IRUs substantially cheaper (say 48 months)
- Obviously higher than on major routes where we are talking <$50

Regulatory Issues

- Single cable, potential bottleneck
- Scope for price gouging
- Regulatory oversight needed
- Cable entity must be able to survive
- Compounded if owner is Govt or NPF
- Complicated if owner is one of the carriers
- Need to ensure benefits to the country

Ongoing Financial issues

- Collection difficulties
- Having enough cash for O&M
- Reserve fund for a cable break
- Enough for debt servicing
- Help unlikely from Dev banks
- Dividend expectations

Implementation

New cable

- Local facilities
- Requirement to build new cable station(s); what infrastructure is available
- What are the backhaul facilities
- Requirement for expertise for implementation and on going system maintenance

Implementation

Redeployed cable

- What is the fault history of the donor cable; how long since it was switched off; Is it necessary to perform sea trials before recovery
- What is the likely speed of recovery, how many cable crossings;
- Availability and choice of recovery vessel

Implementation

Redeployed cable

- What is the donor system configuration, cable type and fibre type;
- Cable engineering - Reconfiguration to be done on board the ship during recovery and transit

Terminal equipment

- Terminal equipment – new or redeployed; Reduced footprint and power benefits vs redeployment of equipment
- PFE reuse – when can it bring benefits
- Specialised training required

Implementation

- Spur of existing cable
  - Type of BU used
  - BU deployment
  - Stub BU - testing

Testing and Commissioning

- Product assurance both for new build and redeployed cable and equipment
- Low day 1 capacity; ensure sufficient spares are provided for testing as well as O&M
- Performance to be optimised for low volume

Operations and Maintenance

- Training for station staff; Experienced station staff required
- Maintaining skills; Requirement for retraining in the case of high staff turnaround; Equipment vendor support;
- Adequate sparing policy used
- Marine maintenance costs

System Upgrades

- Thin routes are unlikely to need frequent upgrades
- Cost of upgrades due to low volume
- NMS upgrades – are they needed to ensure vendor support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