

Case study of USOF Program of Mongolia

Overview & Lessons learned

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opening telecommunications opportunities

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The UA Program development

commenced in 2005

- Consulted operators & other stakeholders, found out latest network development plans and level of interest in UA
- Analysed existing & planned soum mobile coverage
- Developed a UA strategy, established the USOF under CRC
- Two separate market surveys to identify needs, user preferences and overall demand
- Tendered three pilots
- Reviewed experience with the pilots
- Rolled out the main projects in 2008-2009

Mobile coverage by 2007

Mobicom, G-Mobile and Skytel

Network of operator companies



- Approximately 220 soums to have mobile coverage by end 2007
 - Approximately 126 soums with at least two mobile service providers
 - 94 soums with service by one mobile operator
- Approx. 113 soums with no mobile service

Transmission backbone

Backbone Network of Mongolia



Network of operator companies



- The vast majority of soums with mobile service connected via fibre or digital microwave
- Most of the 113 soums without mobile service would need new transmission
 - VSAT may be the most economic backbone for the short term

Satellite solution needed, but herders had other ideas!

- “We’re waiting for mobile to come here!”
- “What model Nokia is that you have?”
- 10% of herders had mobiles even before coverage reached them
- Traveling to find coverage was commonplace
- Today the majority of households may have mobiles



The 2006/7 proposed UA & US policy

- **All soum centres must have**
 - Public access voice telephony – currently provided by MTC
 - Private voice service (wireless/mobile depending on situation)
- **Soum centres must also *increasingly* have**
 - Broadband digital connection via fibre or microwave
 - VSAT a practical “second-best” only for remote locations
 - Internet points of presence with high speed service
 - Public and private access
 - School (subsidized access)
 - Other public agencies in accordance with demand
- **Herder areas must have**
 - Public access to voice telephony services at the bagh level
 - Some areas will benefit from private mobile service
 - Total country coverage needs satellite

UA Demand Studies

- Intelecon, with local associates (MIDAS & InTec) conducted two field studies
 1. Small pilot survey in Arkhangai & Bayankhongor Aimags,
 2. National scale rural demand study
- Purpose of the studies was to:
 1. Test the proposed UA program design concept
 2. Confirm level of affordability & demand for telecom & ICT services in underserved areas of the country
 3. Estimate the maximum allowable subsidies to be offered in the tenders
 4. Provide documentation to add to bidders' knowledge

Phase 1 - Pilot Projects

- **Public access VSAT network for herders in Arkhangai & Bayankhongor**
 - 30 VSATs in 6 soums researched in the field study
 - Average subsidy \$6,000 per VSAT
- **Competitive soum wireless network in Tariat soum centre, Arkhangai**
 - Voice service to customers in soum centre and surrounding areas
 - High speed Internet service to school & public cyber café
 - Subsidy competition won by Mobicom – US\$ 17,000
- **Second soum wireless network in Chuluut soum centre**
 - Two qualifying tenders received –Skytel & Mobicom
 - Competition won by Skytel at US\$ 40,000

Voice services - Lessons from the pilots

Tariat and Chuluut Soums

- **The Herder VSAT network gave valuable revenue & technical design data for remote service provision**
- **The mobile operators were interested in the soum projects**
 - Mobicom were aggressive to win Tariat
 - Skytel has offered an aggressive price for Chuluut
 - Unitel also showed interest
- **But both winners had to use VSATs for backbone**
- **The competitive prices were interesting though the investments were very marginal or loss-making for mobile technology**
- **Smallest and remotest soum centre solutions were expected to utilise low-cost extended Wi-Fi or WiMAX type solutions**

But the emerging options were bold

- **Mobile operators showing increasing interest in herders**
 - 80 of Mobicom's 400 customers in the Tariat soum were herders
 - Skytel also expressed strong support for a mobile strategy
 - G-Mobile entry into the market also focused mobile onto rural areas
- **Eventual strategy focused on mobile base stations in every soum**
- **Plus VSAT Herder Public Access Network (HPAN) for remote bagh areas**
 - Mobile operators would cover the nearest baghs
 - Two VSAT baghs per soum planned as necessary

The final UA strategy:

Voice services

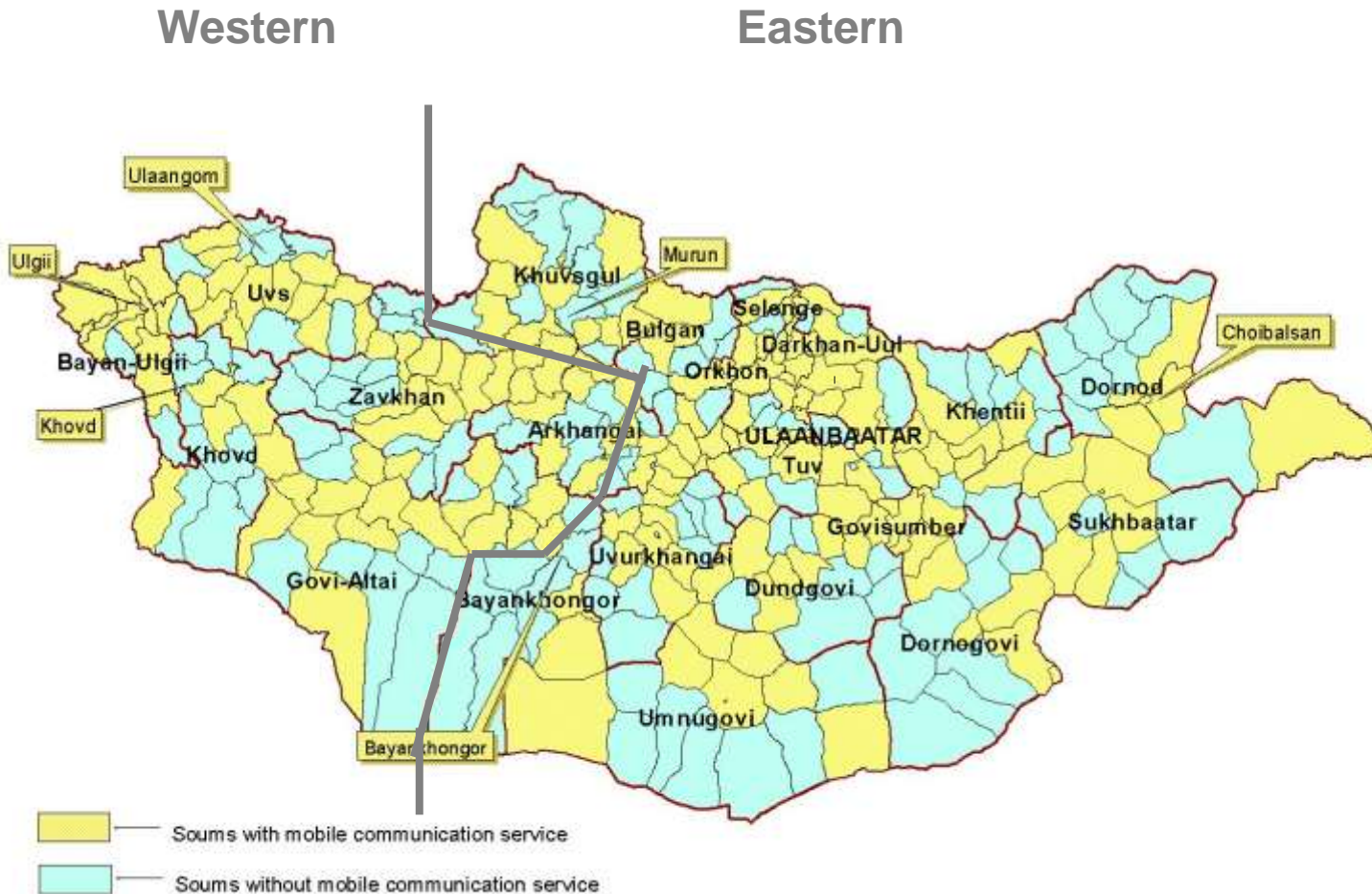
- **113 soums with no current mobile service and none planned for 2007**
 - included 374 baghs
 - 39,000 herder families (average 104 per bagh)
 - Approx. 50% have less than 100 families per bagh
- **Soum centres to be mandated for universal access *and* universal service**
- **All soum centres and baghs to have at least one public access phone**
 - Mobile handset or VSAT based
- **Final ICIDP Plan was 90 soums**
 - USOF implemented 23 Soums with its own money

UA Program – USOF and ICIDP Combined

Aimag, Soum	Region	No. of soums in UA program	No. Baghs in unserved soums	Total no. herder families	Av. No. families per bagh
Arkhangai	Khangai	3	10	1,347	135
BayanUlgii	West	3	13	2,095	161
Bayankhongor	Khangai	8	29	3,407	117
Bulgan	Khangai	5	19	1,624	85
Gobi-Altai	West	6	24	2,420	101
Dornogovi	Central	8	25	1,847	74
Dornod	East	7	20	1,547	77
Dundgovi	Central	7	20	2,274	114
Zavkhan	West	11	37	3,285	89
Uverkhangai	Khangai	5	18	2,422	135
Umnegovi	Central	7	16	1,915	120
Sukhbaatar	East	6	21	2,276	108
Selenge	Central	3	3	228	76
Tuv	Central	6	16	1,157	72
Uvs	West	5	20	2,256	113
Khovd	West	8	28	3,295	118
Khovsgul	Khangai	8	31	3,822	123
Khentii	East	7	24	1,746	73
TOTAL		113	374	38,964	104

The HPAN Tender Regions

to complement the mobile coverage



- Approximately equal size of subsidy & soums
- Combined viable higher population soums with more challenging Gobi areas

Internet service – Pilot experience

- **Tariat's Internet market was slow to develop and the school's response had been disappointing – needed more complementary involvement by Min. of Ed. and others**
 - Lesson was that school would also need more training & technical capacity development the USOF subsidy
 - Therefore increase the training requirement
- **The best candidates for Internet development were seen as:**
 - The larger soum centres already covered by MT exchange & mobile operators
- **Therefore the main Internet roll-out program to focus on adding data to existing services, not for remote areas**
 - This allowed the UA program to cover more soums with better support of schools for the same amount of subsidy

Final Internet Strategy:

POP, public cyber café & subsidized school access

- **ISP Points of presence in soums already having mobile base stations and good terrestrial transmission backbone**
- **Initial criteria – 54 soums selected**
 - At least two mobile operators – indicates market interest
 - Soum centre >1,000 person
 - 24 hours commercial power
- **Other criteria**
 - Must have “Internet ready” school with IT Program & IT teacher
 - Other demonstrated public & private demand
- **Fibre connectivity**
 - Eventual program identified **34 Soums** which received ICTPA support for MPLS data transmission upgrade to Netco’s fibre network

The National Demand Study

- **UA Voice Telephony Program**
 - 1. Sampled 10 soum centres targeted for mobile service**
 - In 8 aimags across three regions
 - 2. Sampled 18 baghs targeted for Herder public access**
 - In 9 aimags across three regions
- **Internet POP services**
 - 3. Sampled 10 soum centres targeted for the UA Internet Development Program**
 - In 8 aimags across three regions

Implementation Report

Results and lessons learnt

- **All programs have been a success**
- **Due largely to**
 - CRC's consistent and committed leadership with the USOF
 - Very positive and supportive response of the operators to support the USOF and compete for the subsidies in challenging markets
 - The World Bank's involvement with US\$ 5 million seed money to the USOF, guaranteeing the operators a benefit ahead of their contributions into the fund
- **Mongolia is a world "best case" example**
 - Mobile presence in all very low population soums
 - Herder public access is a notable achievement
 - The beginnings of Broadband in 34 soums is also an achievement

Soum Wireless Networks (SWN)



Soum Wireless Networks (SWN)

	Aimags	Soums	Pop'n	Subsidy USD	Min. USD	Av. USD	Max. USD
G-Mobile	16	41	135,004	1,267,718	5,998	30,920	62,898
Mobicom	6	10	30,536	302,353	16,200	30,235	45,880
Skytel	8	10	29,837	449,830	16,848	44,983	68,394
Unitel	11	29	71,138	1,041,816	11,729	35,925	59,649
Total	21	90	266,515	3,061,717	5,998	34,019	68,394
				\$11.48 per person			Zavkhan Umnugovi Dornogovi Khovsgul

SWN Customer statistics

	Soums	Sole operator	Other operators compete	Total active customers	Market penetration		
					Min.	Av.	Max.
G-Mobile	41	9	32	18,408	1%	14%	51% Bayanovo/ Kenti
Mobicom	10	9	1	9,316	18%	31%	37% Bayangovi/ Bayankhongor
Skytel	10	7	3	5,148	2%	17%	46% Bayanjargalan /Dundgovi
Unitel	29	21	8	12,665	5%	18%	57% Zavkhan / Uvs
Total	90	46	44	45,537		17%	

SWN Operator experience & views

	G-Mobile	Mobicom	Skytel	Unitel
Has demand met or exceeded expectations?	Yes	Exceeded	Yes	Yes
Is ARPU in the soums higher or lower than national average?	Higher	Lower	Lower	Lower (*Higher)
How many soums are commercially viable / marginal / unviable?	14 / 27 / 0	*0 / 10 / 0	1 / 5 / 4	9 / 11 / 9
Do you have public access in soum centres?	Yes	Yes	Yes	Yes
Do you have public access in baghs where you have signal?	Yes	Yes (Dealers)	Yes	Yes
Do you offer high speed Internet? (Only feasible where transmission is terrestrial)	No (153Kbps)	Some GPRS/EDGE (128/384 Kbps)	No (153 Kbps)	EDGE (384 Kbps)

Role of private business & householders

in universal access to voice services

- **90%+ of public access providers in soum centres are private grocery or other shop owners**
- **90% of public access providers in 2-3 bagh areas per soum are herders (in gers), 10% are bagh officials**

SWN Collective opinions

- **Fibre connectivity to the remaining soums is urgently required**
- **Monthly OPEX cost of VSAT transmission is excessive and also limits:**
 - Voice traffic
 - Operator and user ability to reap benefit from price incentives
 - Data transmission speed
- **Low elevation BTS tower locations in soum centres limit coverage radius out into herder areas**
 - G-Mobile is planning to relocate some BTS's to hill-top locations
- **Unreliable commercial power is still a problem**
 - A number of sites must rely heavily on diesel or solar power

Herder Public Access Network (HPAN)



The Herder Public Access Network

- **Two Incomnet Projects**
 - 74 baghs in Eastern region
 - 78 baghs in Western region
- **Virtually all public access phones were located in gers, managed through contracts between herder families with Incomnet**
 - The herder families received 15% commission on the call revenues
- **Cost to USOF – \$ 0.963 Million**
 - 1.35 x Capital Cost
 - Equivalent to \$ 104/107 total subsidy per month for 5 years
 - Subsidy was US\$ 8.42 per person
- **Contract for services - 5 years**

HPAN Basic statistics

	Eastern	Western
Aimags	10	7
Soums	38	39
Baghs	74	78
Population	52,835	61,182
Users making calls per month (~1 in 4 hshlds)	3,748	4,291
Average calls per user	4.4	4.3
No. of baghs considered viable	20	22
No. of baghs considered marginal	25	38
No. of baghs considered unviable	29	18

HPAN Long term opportunities

- **All VSATs provide valuable service to Herders but their long term viability is measured by usage & revenue**
 - Approx. 1/3 very successful >60,000 Tug per month
 - 1/3 to one half are marginal 20-60,000 Tug per month
 - One quarter to 1/3 are unviable <20,000 Tug per month
- **The Main issue – loss of revenue to mobile in some areas**
 - This is natural overlap and cannot be avoided – especially in East
 - Unviable sites may need ongoing subsidy to be maintained after 5 year contract
- **Western Region more viable and still need for additional HPAN sites due to mountainous topography**
- **The VSATs could become backbone of future broadband Internet network reaching to the remote baghs**

Soum Centre Internet (SCI) Projects



Soum Centre Internet (SCI) Projects

	Mobinet	Sky C&C
Aimags	Umnugovi, Bulgan, Khuvsgul, Dundgovi, Tuv	Uvs, Uvurkhangai, Zavkhan
Soum Centres	17	17
Total subsidy	USD 317,170	USD 561,500
Populations	94,803	77,062
Subsidy per person	US\$ 3.35	US\$ 7.29
Soums considered viable	7	12
Soums considered marginal	6	5
Soums considered unviable	4	0

SCI customer statistics

	Mobinet	Sky C&C
Aimags	Umnugovi, Bulgan, Khuvsgul, Dundgovi, Tuv	Uvs, Uvurkhangai, Zavkhan
Soums	17	17
Av. Users per month in cyber cafes (September)	434	152
Minutes per user	46	35
Internet cafe owners	Trained private individuals	Trained private individuals
Typical users	70-80% students 20-30% government workers also Herders starting to use	
Schools Connected to Internet & teachers trained	Yes	Yes
No . of private customers beyond the school & cybercafe	Typically 2 (bank & Gov't office)	1-2 only (typically Gov't office)

SCI Issues

- **Both Mobinet and Sky C&C report that the investments are valuable to learn about rural Internet**
- **However, no private individuals have been able to afford service to date at the tariff charged**
- **Both companies need to “re-think” their 256 Kbps pricing for it to be affordable to the typical soum centre resident (teacher or civil servant) – earns 300,000 Tug**
- **Current monthly tariff for wireless service is 70,000 Tug + 15,000 CPE rental**
 - Target price has to reduce to 20-30,000 Tug
 - Average soum centres have up to 50 potential residential customers today
- **Coordination with Min. Of Education & Health also needed**
 - Some overlap of programs, but also some schools not fully Internet ready

SWN Issues - Requests for USOF

& ICTPA to further assist UA/S

- **Complete the fibre network to the remaining soums**
 - ICTPA expected to implement in 2011/2012
 - If this not achieved, OPEX Subsidy to cover VSAT/satellite costs
- **Common access infrastructure in remote soums to improve coverage and quality of service**
 - Tower
 - Building
 - Power
 - Air Conditioning
- **Further subsidy for introduction of high speed data transmission to the BTS's**
 - 3G and EVDO requires BTS upgrade and
 - Increased transmission bandwidth

General lessons learned and recommendations

1. Public Access to telephony

- **100% of the 335 soums now have at least one mobile operator (250+ have 2 or 3 operators present)**
- **Only the 90 ICIDP soums have mandated universal access**
 - No mandated public access (apart from MTC) in other soums
- **USOF needs to organize a competition for mandatory public access**
 - If won by mobile operators, MTC would have the option to relinquish its universal access obligation
 - This would vacate wired / FTTH possibility – but competition will be encouraged for next broadband stage of development

General recommendations (2)

2. Broadband Internet affordability

- USOF should consider how to incentivise ISPs to make service available to individual rural customers at an affordable price (< 30,000 Tug per month)
 - Consider role of mobile also
- This could be effected by lower NetCo E1 connectivity prices (current 750,000 Tug is too high for soum applications)
- Up to 50 private residents in each soum - school teachers, civil servants and others - have computers and are ready to take up affordable service

General Recommendations (3)

3. USOF Credibility and Future Role

- The ICIDP Program has shown the way towards making Mongolia's UA/S Program a world best case
- However USOF now appears to have lost momentum
- USOF needs to be rejuvenated as a **Public-Private Partnership** with an effective management board constituted as majority private - the operators who contribute the funds
- Must re-introduce transparent UA/S project planning and tendering & regain support of its stakeholders

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