BACKGROUND

Telecommunications services for the University of Alaska (UA) consist of various data and voice services delivered by several different carriers and service providers. Large capacity circuits (OC-3) connect Fairbanks, Anchorage, and Juneau in a full mesh topology. A large capacity circuit (OC-3) connects Fairbanks and the Pacific Northwest GigaPOP in Seattle, WA to the Internet2 research network. All OC-3 circuits are contracted with Alaska Communications Systems (ACS). A large capacity circuit (DS-3) connects Fairbanks and Anchorage to WCI Cable (WCIC) for commodity Internet service. A large capacity circuit (DS-3) connects UA to AT&T/Alascom (AT&T) in Fairbanks for delivery of Frame Relay T-1 circuits to the UA community campuses around the state through a combination of both terrestrial and satellite services. Cellular service for UA is a combination of both ACS wireless services, and Cellular One wireless services.

ACS is a provider of telecommunications services that primarily are provisioned on fiber optic facilities operated by WCIC.

WCIC is primarily a provider of fiber optic cable infrastructure that follows the rail belt from Fairbanks to Whittier, then to an undersea cable to Nedonna Beach, OR, then a terrestrial cable to Seattle, WA. There is a spur directly to Juneau.

General Communications, Inc. (GCI) is a provider of telecommunications services that primarily are provisioned on fiber optic facilities that follow the Richardson Highway, in addition to secondary terrestrial microwave and satellite facilities. Cellular One service is provisioned on GCI facilities.

AT&T is a provider of telecommunications services that primarily are provisioned on fiber optic facilities that follow the Trans Alaska Pipeline System (TAPS), in addition to secondary terrestrial microwave and satellite facilities.

STATEMENT OF PROBLEM

Telecommunications services for UA were interrupted at 0942 on 10/16/06. Inter-MAU, commodity Internet, Internet2, long distance voice (both land line and cellular) was not available. Services between Fairbanks and UA community campus locations were unaffected. Each MAU (UAF, UAA, and UAS) within the confines of their own network were unaffected.
PROBLEM RESOLUTION

Problem analysis and troubleshooting was conducted by OIT Network Operations (OIT/NO), as summarized below. A detailed timeline of events is in Appendix A.

A. Primary carrier of UA telecommunications services (ACS) was contacted. ACS advised there was a cut to the fiber optic cable of WCIC facilities along the Alaska Railroad (ARR). Established failover/restoral of services to GCI was not available, due to recent storm activity that had disrupted/destroyed GCI facilities; GCI services were in failover/restoral condition on WCIC facilities at this time. No estimated time to repair (ETR) to WCIC facilities was available.

B. OIT/NO contacted UAA and UAS MAU via satellite phone to advise of status. OIT/NO staff in ANC to track with WCIC NOC and ACS NOC on an hourly basis and advise UAA and UAS MAU of ongoing status.

C. ACS advised positive location of cut identified, splicing crews dispatched, and ETR estimated between 1800 – 2000.

D. UA telecommunications services restored at 1942.

E. ACS advised all services for all customers restored as of 0207 on 10/17/06.

PROBLEM ANALYSIS

Interruption in service was caused by a physical break in the WCIC fiber optic facilities. Break was caused by ARR workers installing a culvert under the railroad tracks. Unexpected movement of culvert pipe while being put into place resulted in fiber optic cable being sheared.

Connectivity to UA community campuses was not affected by this incident. AT&T Frame Relay services are delivered over a discrete network that does not traverse the same cable sheath as WCIC.

Established restoral agreement between ACS and GCI was ineffective, due to the fact that GCI was in a failover/restoral condition onto ACS facilities as a result of the recent storm activity.

Long distance voice communication was interrupted as part of this event. Long distance service to UA is via both GCI and AT&T. This issue was resolved by using alternative methods (satellite phones) to contact the UA MAU community, OIT/NO staff, and the respective carrier NOC’s to provide status updates and manage the incident.

Local cellular voice communications was interrupted as part of this event. Each cellular carrier’s digital network appears to have all the switching equipment located in Anchorage. This resulted in cellular radio signal to be available in Fairbanks, but effectively unusable without being able to reach the switching equipment required to establish and conduct calls.
SUMMARY

This incident should be considered a rare occurrence, with two disparate carriers on facilities that are separated by a great distance, to have service interruptions of this magnitude to have occurred at the same time.

ACS is internally reviewing their processes and procedures regarding failover and restoral agreements with other carriers. It has been suggested to them to consider entering an agreement with AT&T (or alternate carrier) to have multiple failover/restoral options in the unlikely event that GCI facilities are not available.

UA OIT is internally reviewing incident management processes and procedures to establish permanent alternative methods to ensure reasonable and adequate emergency voice communications.

APPENDIX A: Detailed timeline of events

10/16/2006

0950: Loss of all telecom services, except FR service via AT&T.

0955: ACS contacted, no status.

0956: ARSC (Harrison) called, gave update.

0956: KUAC (Martin) called, left VM, gave update.

1005: ACS contacted, no new status.

1008: Email sent to OIT SC/SDNCC/SDPS/CITO.

1010: Message hand carried to CITO in President's cabinet meeting.

1015: ACS contacted, no new status.

1020: Verbal with Steve, advised of status.

1034: Update from ACS: All GCI traffic moved to ACS last week, Talkeetna cut the ACS fiber (ARR cut it), so both large carriers down. Local calls OK, no long distance, no cellular service, GCI has no dial tone at all, no ETR.
1039: Email update sent to OIT SC/SDNCC/SDPS/CITO.

1100: Action taken to acquire satellite phones.

1200: Called UAA, UAS, ANC ITS/NO with status update, will be calling ANC ITS/NO 1/hr to distribute info as found.

1220: Email update sent to OIT SC/SDNCC/SDPS/CITO.

1504: Update from ACS: Break is 30 miles N of Talkeetna, no road access, splicing crew onsite, expecting 1800 ETA return.

1800: Repairs have been started.

1900: Bad section of cable located, further digging required, expect to resume repairs ASAP.

1942: All telecommunication services recover, UA monitoring systems all showing clear/up connections. Cell phone service also appears to have recovered between FAI and ANC. Unable to reach UAS.

2000: MAU's updated, still unable to reach UAS.

2100: Contacted WCIC via landline, OC-48 section of ring repaired, now working OC-192 section, no ETR, MAU's updated, still unable to contact UAS.

2200: Work continuing on OC-192 repair, able to leave a VM with UAS.

2300: Repair completed on OC-192, and moving to restore all remaining service at this time.

2400: Working to confirm if field work is completed, unable to contact splicing crew, suspect bad weather is interfering with cell/sat phone service.

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0115: Left VM with WCIC NOC.

0130: Contact with WCIC NOC, no change in status from 2400.

0131: Updated MAU's with current status.

0200: WCIC NOC advised that all field work complete and services restored.

0207: Received final written report from WCIC NOC concerning all work specific to this issue.