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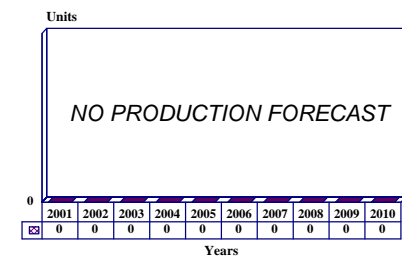
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TTC-42/SB-3865(A) (ULCS) – Archived 10/2002

Outlook

- Support for TTC-42 and 3865 ended in FY00
- No new production anticipated
- Barring any new activity, this report will be archived in the near future

10 Year Unit Production Forecast
2001 - 2010



Orientation

Description. The Unit Level Circuit Switch (ULCS) is a telephone switching system.

Sponsor

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Status. SB-3865 and TTC-42 production completed, although improvements are ongoing.

Total Produced. As of 2001, an estimated 70 TTC-42s and 740 SB-3865s have been produced.

Application. The ULCS is designed for the TRI-TAC system (see separate report) to supply tactical military forces with a transportable, reliable, secure and survivable automatic communications switch. It is a multiservice procurement.

Price Range. The identified contracts do not provide specific dollar figures for these two systems alone; therefore the prices of the SB-3865 and TTC-42 could not be determined.

Technical Data

Design Features. The central elements of the ULCS system are the TTC-42 Automatic Telephone Central Office, providing 150 lines, and the SB-3865 Automatic Telephone Switchboard with 30 lines. It also includes the TA-954 digital non-secure telephone, the TD-1234 digital multiplex unit to allow multiple users at distant locations to access the telephone system, and the Fiber Optic Cable System, which is a collection of items to connect and support the ULCS equipment.

TTC-42. The TTC-42 Automatic Telephone Central Office is a shelter-housed, central office capable of supplying 150 terminations (a combination of subscribers and trunks). It can terminate both analog (up to 24) and digital subscribers and can perform analog-to-digital conversion for analog terminations. The TTC-42 is able to supply subscriber functions, including conferencing, five levels of precedence, preemption, and abbreviated dialing. It is able to interface with DSVTs (Digital Subscriber Voice Terminals), DNVTs (Digital Non-secure Voice Terminals), four-wire analog telephones, the SB-3865 and the TTC-39, and two- and four-wire trunks from some types of analog central offices. The TTC-42 can be equipped with KG-93s for trunk encryption and with KG-82s for loop interfaces with DSVTs, as well as HGX-93s and KY-68/78s.

The TTC-42 is transportable by sea, land, and air using a standard S-280 shelter. The switch includes

automated fault isolation, and software and hardware security protection. The unit also has integral COMSEC and is built to withstand nuclear effects. Its weight is 2,250 kilograms (4,950 lb), with a prime power requirement of 3 kW. Mean time between failures (MTBF) is 802 hours and mean time to repair (MTTR) is 15 minutes.

SB-3865(A). The SB-3865(A) Automatic Telephone Switchboard is a small team-transportable telephone switching unit with a capacity for up to 56 subscribers, including eight data subscribers, which can be expanded to accommodate 86 terminations per switch. A maximum of three units can be interconnected to provide a 256 termination switch, of which 24 can be packet data subscribers. The SB-3865(A) is able to terminate both analog (up to eight) and digital trunk subscribers, and it has built-in analog-to-digital converters. The SB-3865 interfaces with DSVTs, DNVTs, four-wire analog phones, the TTC-42, and the TTC-39. Each comes with a KG-93 SEELEY Trunk Encryption Device for securing all interswitch trunks. It features software and hardware security protection and COMSEC compatibility, and is designed to withstand nuclear effects. The prime power requirement is 350 watts. MTBF is 2,567 hours and MTTR is 10 minutes. The SB-3865(A) consists of two modules: a power module and an electronics module. The total weight of the two modules is 205 pounds.

Variants/Upgrades

Software Upgrades. The US Marine Corps has been continuously developing software improvements. ITT began work on a contract to provide equipment upgrades via new data module installations in 1992. The upgrade consisted of an eight-line packet switch with internal communications security that allows for a control and management system; this system integrates packet switch and circuit switch software into a single package for both the TTC-42(V) and SB-3865 switches.

IDTS. In June 1992, ITT and GTE formed a joint venture to market the Integrated Data Transport System (IDTS) that combines Mobile Subscriber Equipment (MSE), SINCGARS, and the ULCS's SB-3865A integrated circuit and packet switch. ITT combines its SB-3865A switch with SINCGARS radios equipped with a keypad handset to form a secure manpack radio telephone network.

Program Review

Background. The US Marine Corps was assigned the task of developing a unit-level circuit switch to meet all service requirements by the Assistant Secretary of Defense for C³I. The ULCS development and acquisition program was further defined in instructions issued by the director of TRI-TAC (JTC³A) to the Marine Corps. After a competition between ITT and GTE, ITT

was awarded the development contract. A limited production contract was issued in 1986.

The TTC-42 and the SB-3865 switches supply military forces with mobile, reliable, secure and survivable automatic communications. They are adaptable to static or highly mobile operations, large and small force deployments, and low- and high-intensity conflicts.

Both switches will sustain the transition from the analog switched systems of the 1980s to the integrated digital, secure communications systems of the future for tactical air, land, and sea forces by supplying plug-in, interchangeable terminations for both scenarios under the guidance of a common computer. The switches operate with various mixes of digital and analog loops and trunks in secure and non-secure modes. Specifically, the ULCS extends, when needed, the performance capabilities of TRI-TAC's large-capacity switch, the TTC-39, and its associated COMSEC with the SB-3865, to the unit level.

Problems. The ULCS program, after encountering more than its share of problems (mostly centered on the TTC-42 portion of the program, which had been years behind schedule with severe cost overruns), was well on its way after the successful completion of the Limited Operational Test in early 1987. The situation had become so irksome that in FY85 Congress denied production funds for the TTC-42 and ordered a test-off against a smaller version of GTE's TTC-39. The follow-on ULCS R&D program initiated in June 1984 proved successful, and in January 1986 the Marine Corps ULCS program office determined that only one of 292 performance reports written against the ULCS during any phase of testing was still considered to be unresolved. Congressional testimony that year showed that operational availability for both the TTC-42 and SB-3865 was in excess of 99 percent.

In September 1986, the General Accounting Office (GAO) issued a report that upheld the Navy's disqualification of the GTE bid for the production program. The report revealed that ITT received a final evaluation score of 56.73 points (out of a possible 70) for technical compliance and schedule, while GTE received only 21.56 points, largely because its proposal was too developmental in nature and used untested software. GTE had also proposed a version of its SB-3614 in place of ITT's SB-3865, but was turned down, both because this version was untested and

because it would have been incompatible with the TTC-39 software.

The first two TTC-42s were delivered in May 1989. In January 1990, The Navy exercised an option for an additional 92 SB-3865 and 112 fault assistance modules (FAMs) for the Marine Corps.

The Desert Storm experience led to calls for improvements to the ULCS, with the Navy initiating a ULCS and software integration and support effort in FY91. These improvements included increasing the line capacity from 150 to 280 lines and incorporating a packet data switching capability. Work continues on integration of packet switch and circuit switch software into a single package for the TTC-42 and SB-3865.

Software improvements are continuing, with plans to make the new data module compatible with the Government Open Systems Interconnection Profile (GOSIP). Work on the ULCS Product Improvement Program (PIP) also continues, and software development for ULCS PIP was completed in FY97.

A portion of this program centered on enhancing compatibility between the Unit Level Tactical Data Switch and the ULCS. From FY97 to FY01, TTC-42 and SB-3865 upgrades were expected to be funded under the Marine Corps' RDT&E Program Element (PE) number 0206313M - Communications Switching and Control Systems.

By May 2001, an upgrade involving the installation of special purpose circuit card assemblies was to be completed. The new circuit card assemblies are designed to provide improved access to fixed plant analog and DSN trunk connections, commercial access, and STU-III telephone connections.

US Marine Corps funding under PE#0206313M - Project C2276 was expected to end in 2001. However, at a March 2000 Marine Corps Tactical Systems Support Activity (MCTSSA) conference it was decided that fiscal year 2000 would be the last year for TTC-42 support.

<u>Year</u>	<u>Major Development</u>
FY92	US\$54.6 million contract awarded to ITT for data module insertion to TTC-42(V) and SB-3865
FY93	US\$31 million contract awarded to ITT to provide USMC with a data module upgrade
FY95	US\$6.5 million contract awarded to Olin for spare parts in support of the TTC-42 switch
FY97	ULCS software development for ULCS PIP completed
FY00	Last scheduled year of funding for ULCS software improvements
FY10	TRI-TAC program scheduled to be completed

Worldwide Distribution

At present, both ULCS components are **US** programs only, despite sporadic overseas interest in the SB-3865 from Australia, Canada, Jordan and Saudi Arabia.

Forecast Rationale

The TTC-42 and the SB-3865, which are the main components of the Unit Level Circuit Switch (ULCS) telephone switching system, provide the circuit and data switching capabilities of the TRI-TAC (Joint Tactical Communications Program) program. The system provides automatic, secure/non-secure, tactical, commercial, and DSN telephone service, with COMSEC key generation, to the TRI-TAC family of four-wire digital terminal instruments (DSVT and DNVT), as well as analog and commercial phones.

Approximately 70 TTC-42s and 740 SB-3865s have been produced in support of the TRI-TAC architecture. Despite their successful track records, these systems are no longer in production. At a March 2000 Marine Corps Tactical Systems Support Activity (MCTSSA)

conference it was decided that fiscal year 2000 would be the last year for TTC-42 support. The last known upgrade for the TTC-42 and the SB-3865 were scheduled to be completed by May 2001.

With the lack of further funding and the termination of the TRI-TAC program scheduled for 2010, it is very unlikely that any new TTC-42s or SB-3865s will be produced, although upgrades are still a possibility. The ULCS system should remain in use throughout the next 10 years alongside the TRI-TAC network. However, once the TRI-TAC network is concluded, the ULCS is also expected to be taken out of service. Barring any new activity, this report will be archived in the near future.

Ten-Year Outlook

No further production is expected.

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