



US005172375A

United States Patent [19]
Kou

[11] Patent Number: 5,172,375
[45] Date of Patent: Dec. 15, 1992

[54] MULTIPLE ACCESS SATELLITE COMMUNICATION SYSTEM FOR MINI-EARTH STATION NETWORKS

[75] Inventor: Yukari Kou, Tokyo, Japan
[73] Assignee: NEC Corporation, Japan
[21] Appl. No.: 543,677
[22] Filed: Jun. 25, 1990

for Mini-Earth Station Networks”, vol. 3 of 3, pp. 1494-1499 (1986).

Primary Examiner—Douglas W. Olms
Assistant Examiner—T. Samuel
Attorney, Agent, or Firm—Ostrolenk, Faber, Gerb & Soffen

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 542,205, Jun. 22, 1990, abandoned.

[30] Foreign Application Priority Data

Jun. 22, 1989 [JP] Japan 1-158186

[51] Int. Cl.⁵ H04J 3/16

[52] U.S. Cl. 370/95.3; 370/104.1

[58] Field of Search 370/95.3, 94.1, 104.1, 370/95.1, 94.2

[56] References Cited

U.S. PATENT DOCUMENTS

| | | | |
|-----------|---------|----------------|-----------|
| 3,806,879 | 4/1974 | Schmidt et al. | 370/104.1 |
| 4,381,562 | 4/1983 | Acampora | 370/97 |
| 4,731,783 | 3/1988 | Fontanes | 370/104.1 |
| 4,742,512 | 5/1988 | Akashi et al. | 370/95.3 |
| 4,775,974 | 10/1988 | Koboyoshi | 370/94.1 |

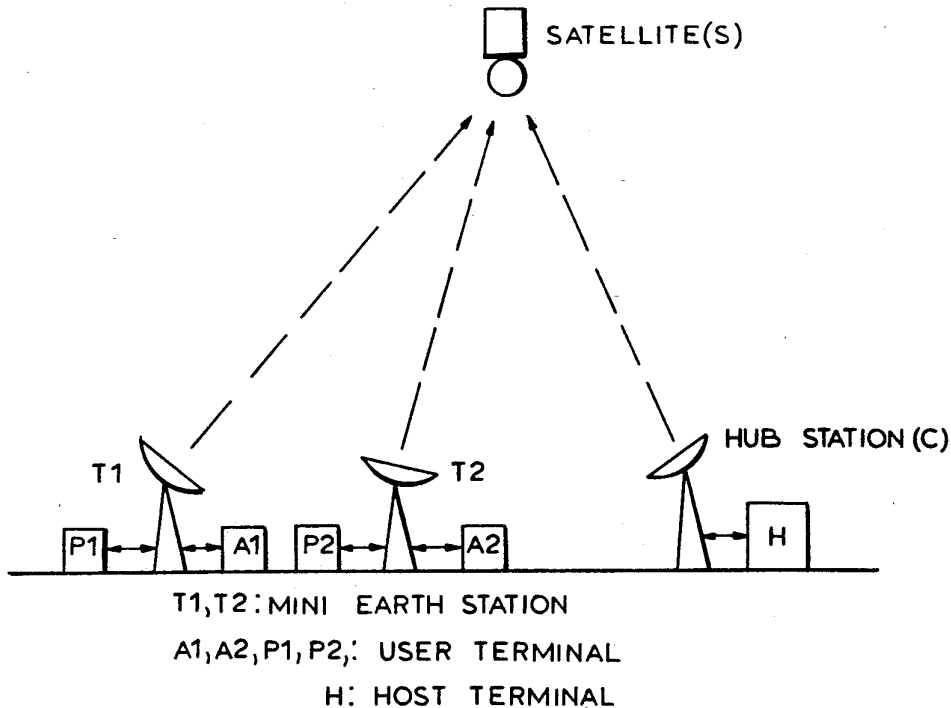
OTHER PUBLICATIONS

A. Fujii et al., *IEEE Global Telecommunications Conference*, "AA/TDMA—Adaptive Satellite Access Method

[57] ABSTRACT

A multiple access satellite communication system in which a plurality of mini-earth stations each transmit data packets to hub earth station via a satellite over an inbound channel, while the hub station transmits to the mini-earth stations in a broadcast mode over outbound channels. Each mini-earth station selectively uses a fixed assignment access method, random access method, and demand assignment access method, depending on the frequency of the transmission from a terminal connected thereto, the amount of transmitted data, and whether or not the transmission from the terminal is periodic. The hub station outputs a reception response signal to the outbound channels by determining whether or not a conflict of data packets or a transmission error has occurred on the inbound channels. Packets for re-transmission are sent out to the inbound channels by the demand assignment access method at all times, with no regard to the access method used at the time of transmission.

3 Claims, 18 Drawing Sheets



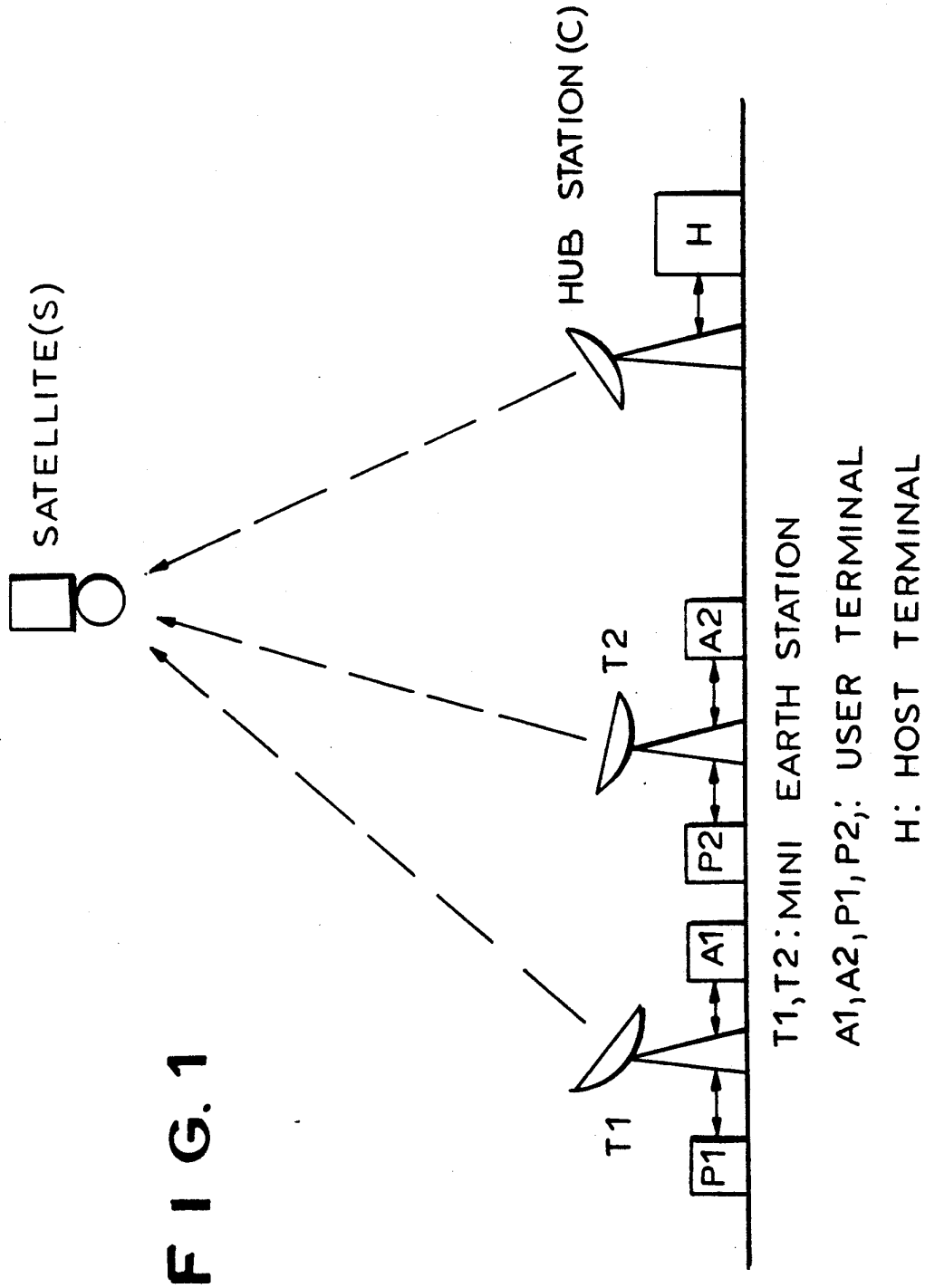
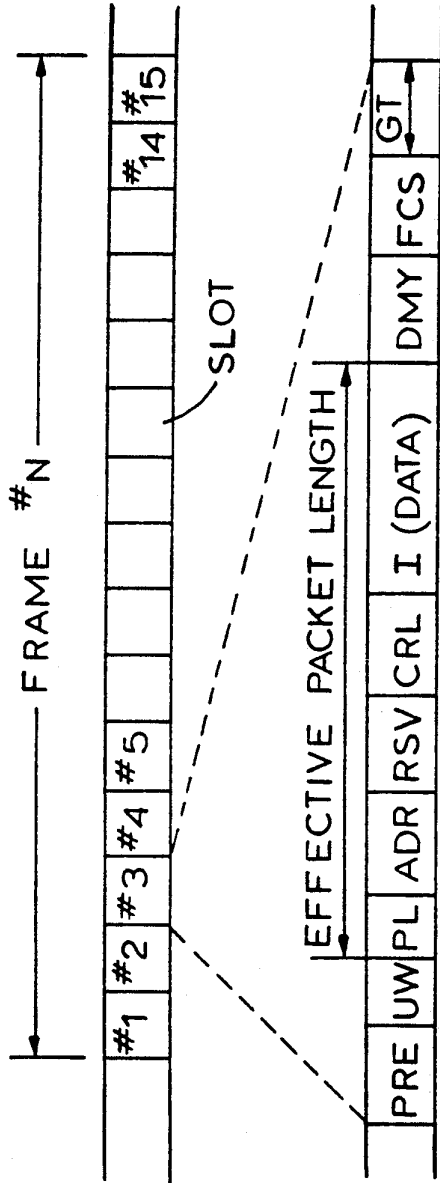


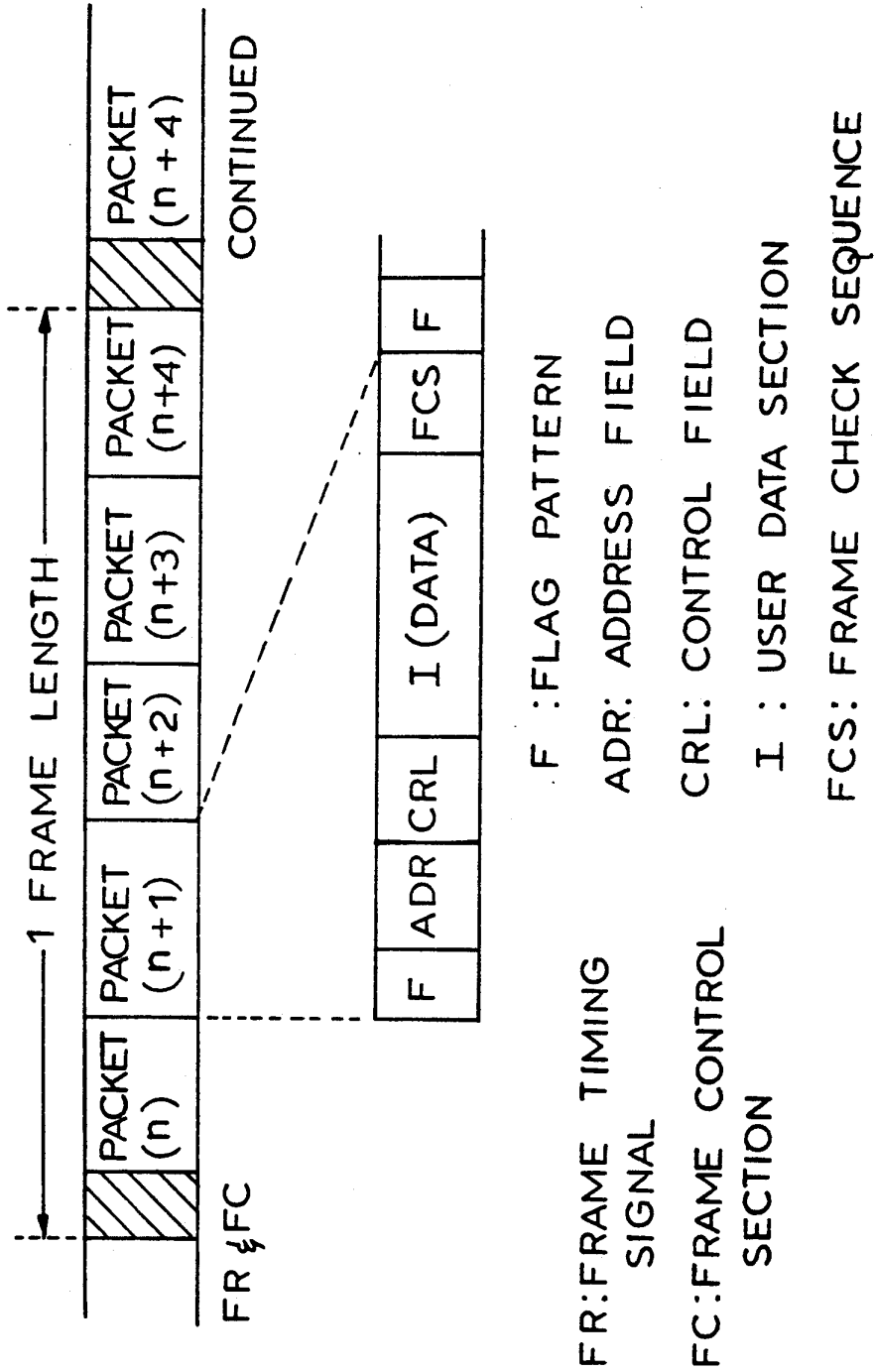
FIG. 1

FIG. 2



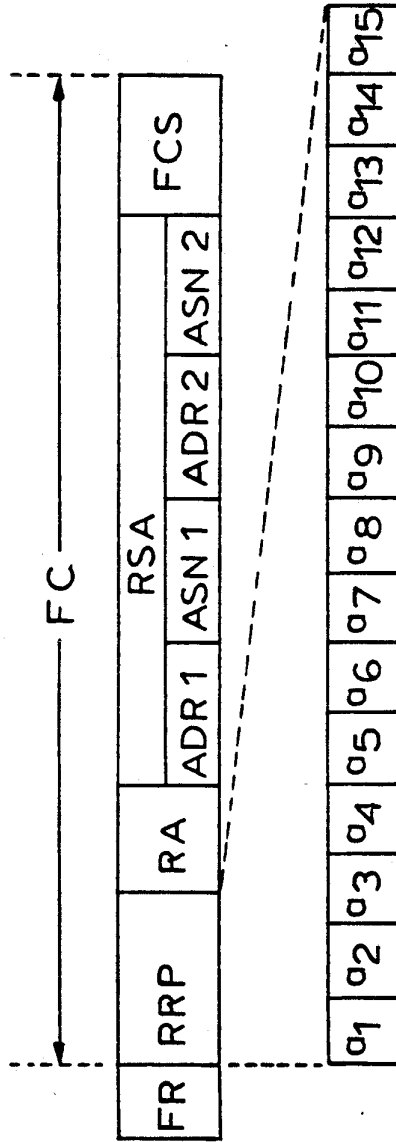
PRE: PREAMBLE
 UW: UNIQUE WORD
 PL: EFFECTIVE PACKET LENGTH
 ADR: MINI-EARTH STATION ADDRESS FIELD
 RSV: RESERVATION SLOT REQUEST FIELD
 CRL: CONTROL FIELD
 I: USER DATA SECTION
 DMY: DUMMY BITS
 FCS: FRAME CHECK SEQUENCE
 GT: GUARD TIME

FIG. 3



FR: FRAME TIMING SIGNAL
 FC: FRAME CONTROL SECTION

FIG. 4



RRP: RECEPTION RESPONSE FIELD

RA: RANDOM ACCESS SLOT ASSIGNMENT FIELD

RSA: RESERVED ACCESS SLOT ASSIGNMENT FIELD

FCS: FRAME CHECK SEQUENCE

01~015: ACK/NAK

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.