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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Ex parte KEVIN CLARE EICHHORST

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Appeal 2018-003856
Application 14/277,976
Technology Center 2600

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Before JEAN R. HOMERE, JOHN R. KENNY, and MICHAEL J. ENGLE, *Administrative Patent Judges*.

KENNY, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's decision to reject claims 1, 2, 4–14, 16, 17, 19, and 20. Final Act. 1; Appeal Br. 1. Claims 3, 15, 18, 21, and 22 have been canceled. Final Act. 2. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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[1] We use the word Appellant to refer to "applicant" as defined in 37 C.F.R. § 1.42(a). Appellant identifies the real party in interest as Global Traffic Technologies, LLC. Appeal Br. 1.

SPECIFICATION

Appellant's Specification is directed to managing traffic signal priority requests from transit vehicles. Spec. ¶ 1. The Specification discloses managing transit signal priority (TSP) requests by detecting the arrival or departure (arrival/departure) of a transit vehicle at a transit stop. *Id.* ¶ 27. The Specification's disclosed methods and systems use the actual time of arrival/departure at a scheduled stop to determine whether to send TSP requests, rather than continually monitoring the location and speed of a vehicle and estimating the time of arrival at a scheduled stop. *Id.* The Specification indicates that this approach may avoid unnecessarily disrupting the normal cycling of traffic signals. *Id.* In particular, this approach can avoid disruptions due to TSP requests from a vehicle that may be experiencing transitory or intermittent traffic conditions that are unlikely to affect the ability of the vehicle to stay on-schedule. *Id.*

CLAIMS

Claims 1, 13, 16, and 19 are independent claims. Claim 1 is illustrative and reads as follows:

> 1. A method of managing transit signal priority (TSP) requests, comprising:
>
> detecting arrival of a first transit vehicle at a transit stop;
>
> storing a first value indicative of an actual arrival time in a memory in response to the arrival of the first transit vehicle at the transit stop;
>
> determining by a processor from the first value whether or not the actual arrival time of the first transit vehicle satisfies a scheduling parameter;

enabling a priority request device to make TSP requests in response to the actual arrival time of the first transit vehicle not satisfying the scheduling parameter;

disabling the priority request device from making TSP requests in response to the actual arrival time of the first transit vehicle satisfying the scheduling parameter;

in response to a second transit vehicle arriving at the transit stop before the first transit vehicle, storing a second value indicative of an actual arrival time in association with an identifier of the second transit vehicle; and

wherein the scheduling parameter indicates a scheduled headway separating the first transit vehicle from the second transit vehicle, and the determining includes:

determining that the actual arrival time of the first transit vehicle does not satisfy the scheduling parameter in response to the first and second values indicating that the actual arrival time of the first transit vehicle follows the actual arrival time of the second transit vehicle by more than the scheduled headway plus a threshold quantity of time, or indicating that the actual arrival time of the second transit vehicle precedes the actual arrival time of the first transit vehicle by less than the scheduled headway minus the threshold quantity of time; and

determining that the actual arrival time of the first transit vehicle satisfies the scheduling parameter in response to the first and second values indicating that the actual arrival time of the first transit vehicle follows the actual arrival time of the second transit vehicle by less than the scheduled headway plus the threshold quantity of time and indicating that the actual arrival time of the second transit vehicle precedes the actual arrival time of the first transit vehicle by more than the scheduled headway minus the threshold quantity of time.

REFERENCES

The references relied upon by the Examiner are:

Name	Reference	Date
Chiu	US 2011/0221615 A1	Sept. 15, 2011
Cross	US 2012/0326890 A1	Dec. 27, 2012

REJECTIONS

Claims 1, 2, 4–7, 9, and 10 stand rejected under 35 U.S.C. § 103 as unpatentable over Cross.[2] Final Act. 2.

Claims 8, 11–14, 16, 17, 19, and 20 stand rejected under 35 U.S.C. § 103 as unpatentable over the combination of Cross and Chiu.[3] Final Act. 8.

ANALYSIS

Claims 1, 2, 6, 7, and 9

Appellant argues that Cross does not teach or suggest using actual arrival times to determine headway as required by claim 1. Appeal Br. 8. The limitations of claim 1 that recite the use of actual arrival times to determine headway are:

> determining that the *actual arrival time* of the first transit vehicle does not satisfy the scheduling parameter in response to the first and second values indicating that the *actual arrival time* of the first transit vehicle *follows* the *actual arrival time* of the second transit vehicle *by more* than the *scheduled headway* plus a threshold quantity of time, or indicating that the *actual arrival time* of the second transit vehicle *precedes* the *actual arrival time* of the first transit vehicle by less than the *scheduled headway* minus the threshold quantity of time; and

> determining that the *actual arrival time* of the first transit vehicle satisfies the scheduling parameter in response to the first

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[2] Canceled claims 3 and 22 were also rejected as obvious over Cross. Final Act. 2.
[3] Canceled claims 15, 18, and 21 were also rejected as obvious over the combination of Cross and Chiu. Final Act. 8.

and second values indicating that the *actual arrival time* of the first transit vehicle follows the *actual arrival time* of the second transit vehicle by less than the *scheduled headway* plus the threshold quantity of time and indicating that the *actual arrival time* of the second transit vehicle *precedes* the *actual arrival time* of the first transit vehicle by more than the *scheduled headway* minus the threshold quantity of time.

Claims Appendix, emphasis added.

The Examiner finds that Cross teaches or suggests the above limitations. Final Act. 4, 21–22; Ans. 3–12. The Examiner finds that Cross discloses that its vehicles are each equipped with a vehicle computer unit (VCU) that determines the real-time location of the vehicle at all times. Ans. 3 (citing Cross ¶ 35). The Examiner notes that the VCU calculates and determines whether or not the vehicle is on schedule. *Id.* (citing Cross ¶ 37). Further, the Examiner finds that "[t]o enable the VCU to determine whether or not the vehicle is on schedule, the VCU includes a map of the traffic grid and the map and schedule of the mass transit vehicle in which it is installed, along with other mass transit vehicles on the grid." *Id.* (citing Cross ¶ 37).

The Examiner further finds that to determine whether the vehicle arrived behind schedule, on schedule, or ahead of schedule, the VCU must compare the actual arrival time of the vehicle at a bus stop to the scheduled arrival time of the vehicle at that bus stop. *Id.* And the Examiner finds that the VCU's capabilities (e.g., determining the location of the vehicle) and resources (e.g., the route map and schedule) enable the VCU to make that determination. *Id.*

Appellant argues that Cross does not have to use actual times of arrival for that purpose. Appeal Br. 9–11; Reply Br. 1–6. Appellant argues that instead Cross can use estimated times of arrival (ETA) to determine

whether a vehicle is on schedule. Appeal Br. 9–11; Reply Br. 1–6.
Appellant further argues that the term "actual arrival time" should not be
construed to encompass "estimated time of arrival." Appeal Br. 11.

Claim 1 was rejected for obviousness, so the issue before us is
whether Cross teaches or suggests using actual arrival times to determine
headway, not whether using actual arrival times is the only way to determine
headway in Cross. Based on the record before us, we find that Cross teaches
or *suggests* using actual arrival times to determine headway. Cross
describes determining "real-time location data" for vehicles. Cross ¶¶ 37,
74. Cross describes storing map and schedule data in vehicle VCUs. *Id.*
¶ 74. Cross also describes communicating vehicle location data to a remote
traffic control center. *Id.* ¶ 37. Further, Cross discloses determining
headway amounts, reestablishing headway amounts, and allowing
monitoring personnel to view headway amounts, rather than only
determining *estimated* headway amounts, reestablishing *estimated* headway
amounts and allowing monitoring personnel to view *estimated* headway
amounts. *Id.* ¶¶ 74, 75. Because Cross discloses determining actual
headway amounts, reestablishing actual headway amounts, and allowing
monitoring personnel to view actual headway amounts, Cross teaches or
suggests using actual arrival times to determine headway to provide
headway amounts. In reaching this finding, we do not construe the term
"actual arrival time" to encompass "estimated time of arrival." Instead, we
find that the above-cited disclosures in Cross suggest using actual arrival
times, not merely estimated arrival times, to determine headway.

Thus, we sustain the rejection of claim 1 and of claims 2, 6, 7, and 9, not argued separately. Appeal Br. 5–14.

Claims 4 and 5

Appellant argues that Cross does not teach or suggest the limitation recited in claim 4 of "wherein the scheduling parameter includes a plurality of headway values and associated times-of-day, and the method further comprising selecting one of the headway values as the scheduled headway based on current time-of-day and the times-of-day associated with the headway values." Appeal Br. 12; Reply Br. 12–13.

The Examiner finds that Cross teaches or suggests this limitation by disclosing that its system takes into account the high variability of traffic flows throughout the day and on-street congestion. Ans. 13–14 (citing Cross ¶¶ 61, 62). The Examiner finds that, by taking into account these influences, Cross teaches or suggests using different scheduled headway values during rush hour periods, which are known to involve congestion. *Id.* at 14. Appellant disagrees, arguing that Cross only suggests setting desired headways based on traffic conditions, not based on the current time of day. Appeal Br. 12; Reply Br. 12–13.

We agree with the Examiner. Appellant has not provided any persuasive argument why the cited disclosures in Cross would not teach or suggest using different scheduled headways during rush hour periods. Appeal Br. 12; Reply Br. 12–13. The Examiner indicates, and Appellant has not disputed, that, based on an ordinarily skilled artisan's general knowledge, an ordinarily skilled artisan would have been aware that scheduled headway times tend to be shorter during rush hours. Ans. 13–14; Reply Br. 12–13; *see also, e.g.*, Coates, US 7,590,553, issued Sept. 15, 2009,

10:17–23 ("The rush hour [bus] departures are on the hour, 10 minutes past the hour, 20 minutes past the hour, 30 minutes past the hour, 40 minutes past the hour, and 50 minutes past the hour. . . . The normal service departures are on the hour, 15 minutes past the hour, 30 minutes past the hour, and 45 minutes past the hour.").[4] Thus, we agree with the Examiner that Cross teaches or suggests the disputed limitation of claim 4.

Accordingly, we sustain the rejection of claim 4 and of claim 5, not separately argued. Appeal Br. 12.

Claim 10

Appellant argues that Cross does not teach or suggest the limitation recited in claim 10 of "in response to the current speed being 0 and a door of the first transit vehicle being open, determining a current time, and setting the first value to a value indicative of the current time." Appeal Br. 12–13. The Examiner finds that Cross teaches or suggests this limitation by disclosing that its VCU determines the location and velocity of the vehicle at all times. Ans. 15–16. The Examiner finds that, by determining the location and velocity of the vehicle at all times, Cross discloses determining the location and velocity of the vehicle when it is stopped at a bus stop, where its velocity would be zero and its door would be open. *Id.* The Examiner further finds that Cross discloses displaying maps of and logs vehicle activity in real-time, so Cross's system would track the time when a bus stopped with its door open. *Id.*

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[4] These scheduled headways during rush hours and normal service are ten and fifteen minutes, respectively.

Appellant argues that Cross teaches that, when the doors of its transit vehicle are open, the vehicle goes into a standby mode. Appeal Br. 12; Reply Br. 14–15. According to Appellant, in standby mode, Cross's vehicle has no need to send priority signaling to traffic signals. App. Br. 12; Reply Br. 14–15. Appellant further argues that Cross does not disclose tracking times with cancel calls that are sent in standby mode. App. Br. 12; Reply Br. 14–15.

We agree with the Examiner. Appellant has not identified, and we see no, errors in any of the following findings by the Examiner that: (i) Cross discloses that its VCU determines the location and velocity of the vehicle at all times, (ii) by determining the location and velocity of the vehicle at all times, Cross discloses determining the location and velocity of the vehicle when it is stopped at a bus stop, (iii) when Cross's vehicle stops at a bus stop, its velocity would be zero and its door would be open, (iv) Cross discloses displaying maps of and logs vehicle activity in real-time, and (v) "[t]hese disclosures indicate that by displaying maps of vehicle activity in real-time and creating detailed logs of vehicle activity in real-time, the system of Cross tracks the time of notifications from the VCU, so the system of Cross would track the time when the bus is stopped with the doors open." Appeal Br. 12; Ans. 15–16 (citing Cross ¶¶ 34, 35, 37, 51, 63, 73); Reply Br. 13–15. These findings teach or suggest the disputed limitation.

Appellant's argument that Cross's vehicle may not need to send priority signals to traffic signals when it is in standby mode is misplaced. Appeal Br. 12; Reply Br. 13–15. The issue is not whether Cross must send priority signals to traffic signals, but rather whether Cross teaches or

suggests the disputed limitation. Here, the Examiner has identified another reason for sending Cross's vehicle location and velocity to its traffic control system: monitoring the vehicle in real-time. Ans. 15–16 (citing Cross ¶ 34). So even if Appellant were correct that Cross would not need to send priority signals to traffic signals when the bus is stopped, that fact would not negate the other identified reason for determining and sending the velocity and location of the vehicle to the traffic control system. Accordingly, we are not persuaded by Appellant's argument, and we sustain the rejection of claim 10.

Claim 12

Appellant argues that Cross does not suggest using the departure time of a vehicle from a transit stop to determine schedule adherence and to control TSP requests, as required by claim 12. Appeal Br. 13. The Examiner finds that Cross discloses a "skip-stop" mode where Cross's vehicle skips a bus stop where it would ordinarily stop. Ans. 17 (citing Cross ¶¶ 34, 37, 74, 75). The Examiner further finds that when the vehicle skips the involved bus stop, the vehicle's VCU continues to determine vehicle location and velocity. *Id.* (citing Cross ¶¶ 34, 37). In this skip-stop mode, the Examiner finds that the vehicle's arrival time at the stop is the same as its departure time. *Id.* The Examiner further finds that, even when the skip-stop mode is not used, the VCU calculates an estimated time of arrival for the next stop/light based on the location of the preceding bus stop. *Id.* at 18–19. The Examiner finds that would teach or suggest to an ordinarily skilled artisan to compare the departure time to a schedule that specifies departure times. *Id.*

Appellant argues that if a bus skips a stop, the bus did not arrive at or depart from the stop because a commuter would not view a passing by as an arrival. Appeal Br. 13–14; Reply Br. 16. But Appellant does not explain why an ordinarily skilled artisan would not view such an action as an arrival and departure, particularly for comparison with a schedule. A skipped stop, as set forth by the Examiner, involves a bus arriving and departing without stopping. Appeal Br. 13–14; Reply Br. 16. Although a skipped stop may be to the commuter's dismay, the bus nevertheless arrives when it reaches the skipped stop's location and departs from the stop when it leaves that location. And Appellant provides no persuasive argument why an ordinarily skilled artisan would not view such actions as an arrival and a departure that could be compared to a schedule.

Appellant also argues that Cross does not suggest comparing actual arrival times to a schedule, so Cross would not suggest comparing departure times either. Reply Br. 16. We are not persuaded by this argument, because for the reasons set forth in our discussion of claim 1, we find Cross teaches or suggests comparing actual arrival times to a schedule. Thus, we sustain the rejection of claim 12.

Claims 8, 11, 13, 14, 16, 17, 19, and 20

Appellant presents the same arguments for claims 8, 11, 13, 14, 16, 17, 19, and 20 as it presents for claim 1. Appeal Br. 14. Thus, we sustain the rejection of claims 8, 11, 13, 14, 16, 17, 19, and 20 for the same reasons as for claim 1.

CONCLUSION

The Examiner's rejections are affirmed.

DECISION SUMMARY

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 2, 4–7, 9, 10	103	Cross	1, 2, 4–7, 9, 10	
8, 11–14, 16, 17, 19, 20	103	Cross, Chiu	8, 11–14, 16, 17, 19, 20	
Overall Outcome			1, 2, 4–14, 16, 17, 19, 20	

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED