

408, was executed by renumbering section 412 as this section as if “and” had read “as”, to reflect the probable intent of Congress.

[§ 409. Renumbered § 407]

[§§ 410, 411. Repealed. Pub. L. 112–141, div. C, title I, § 31109(e), (f), July 6, 2012, 126 Stat. 757]

Section 410, added Pub. L. 100–690, title IX, §9002(a), Nov. 18, 1988, 102 Stat. 4521; amended Pub. L. 101–516, title III, §336, Nov. 5, 1990, 104 Stat. 2186; Pub. L. 102–240, title II, §2004(a), Dec. 18, 1991, 105 Stat. 2073; Pub. L. 102–388, title VI, §§601–606, Oct. 6, 1992, 106 Stat. 1569, 1570; Pub. L. 104–59, title III, §324, Nov. 28, 1995, 109 Stat. 591; Pub. L. 105–18, title II, §8003, June 12, 1997, 111 Stat. 195; Pub. L. 105–130, §6(b), Dec. 1, 1997, 111 Stat. 2558; Pub. L. 105–178, title II, §2004(a), June 9, 1998, 112 Stat. 328; Pub. L. 108–88, §6(e)(1), Sept. 30, 2003, 117 Stat. 1120; Pub. L. 108–310, §6(e)(1), Sept. 30, 2004, 118 Stat. 1152; Pub. L. 109–59, title II, §2007(a), (b), Aug. 10, 2005, 119 Stat. 1529; Pub. L. 110–244, title III, §303(c)(2), (3), June 6, 2008, 122 Stat. 1619; Pub. L. 111–147, title IV, §421(f)(1), Mar. 18, 2010, 124 Stat. 85; Pub. L. 112–30, title I, §121(f)(1), Sept. 16, 2011, 125 Stat. 347, related to alcohol-impaired driving countermeasures.

Section 411, added Pub. L. 105–178, title II, §2005(a), June 9, 1998, 112 Stat. 332; amended Pub. L. 110–244, title III, §303(c)(4), June 6, 2008, 122 Stat. 1619, related to State highway safety data improvements.

Statutory Notes and Related Subsidiaries

EFFECTIVE DATE OF REPEAL

Repeal effective Oct. 1, 2012, see section 3(a) of Pub. L. 112–141, set out as an Effective and Termination Dates of 2012 Amendment note under section 101 of this title.

REPEAL OF PROGRAMS

Pub. L. 112–141, div. C, title I, §31109(a), July 6, 2012, 126 Stat. 756, provided that: “A repeal made by this section [repealing sections 406 to 408, 410, and 411 of this title and repealing provisions set out as notes under sections 402, 403, and 405 of this title] shall not affect amounts apportioned or allocated before the effective date of such repeal [Oct. 1, 2012, see section 3(a) of Pub. L. 112–141, set out as an Effective and Termination Dates of 2012 Amendment note under section 101 of this title], provided that such apportioned or allocated funds continue to be subject to the requirements to which such funds were subject under the repealed section as in effect on the day before the date of the repeal.”

[§ 412. Renumbered § 408]

CHAPTER 5—RESEARCH, TECHNOLOGY, AND EDUCATION

Sec.	
501.	Definitions.
502.	Surface transportation research, development, and technology.
503.	Research and technology development and deployment.
504.	Training and education.
505.	State planning and research.
[506 to 509.	Repealed.]
510.	Future strategic highway research program.
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512.	National ITS program plan.
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518.	Vehicle-to-vehicle and vehicle-to-infrastructure communications systems deployment.
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Editorial Notes

PRIOR PROVISIONS

A prior chapter 5, added Pub. L. 90–495, §30, Aug. 23, 1968, 82 Stat. 830, consisting of sections 501 to 512, related to highway relocation assistance, prior to repeal by Pub. L. 91–646, title II, §220(a)(10), Jan. 2, 1971, 84 Stat. 1903. See section 4601 et seq. of Title 42, The Public Health and Welfare. For Effective Date of Repeal and Savings Provisions, see sections 221 and 220(b) of Pub. L. 91–646, set out as notes under sections 4601 and 4621, respectively, of Title 42.

AMENDMENTS

2021—Pub. L. 117–58, div. A, title III, §13009(b), Nov. 15, 2021, 135 Stat. 644, added item 520.

2015—Pub. L. 114–94, div. A, title VI, §§6010(b), 6019(d)(1)(B), Dec. 4, 2015, 129 Stat. 1568, 1581, struck out item 508 “Transportation research and development strategic planning”, substituted “National ITS program plan” for “National ITS Program Plan” in item 512, and added item 519.

2012—Pub. L. 112–141, div. E, title II, §§52002(b), 52003(b), 52006(b), 52007(b), 52008(b), title III, §§53002(b), 53003(b), 53004(b), 53005(b), 53006(b), July 6, 2012, 126 Stat. 872, 880, 882, 899, 901–903, 905, substituted “Surface transportation research, development, and technology” for “Surface transportation research” in item 502 and “Research and technology development and deployment” for “Technology deployment program” in item 503, struck out items 506 “International highway transportation outreach program”, 507 “Surface transportation environment and planning cooperative research program”, and 509 “National cooperative freight transportation research program”, and added items 514 to 518.

2008—Pub. L. 110–244, title I, §111(b)(2)(B), June 6, 2008, 122 Stat. 1605, amended Pub. L. 109–59, §5210. See 2005 Amendment note below.

2005—Pub. L. 109–59, title V, §5210(c), formerly §5210(d), Aug. 10, 2005, 119 Stat. 1804, as renumbered by Pub. L. 110–244, title I, §111(b)(2)(B), June 6, 2008, 122 Stat. 1605, added item 510.

Pub. L. 109–59, title V, §§5201(a)(2), 5207(c), 5208(b), 5209(c), 5211(c), 5301(b), 5302(b), Aug. 10, 2005, 119 Stat. 1781, 1798, 1799, 1801, 1804, 1805, substituted “RESEARCH, TECHNOLOGY, AND EDUCATION” for “RESEARCH AND TECHNOLOGY” in chapter heading, “Surface transportation environment and planning cooperative research program” for “Surface transportation-environment cooperative research program” in item 507, “Transportation research and development strategic planning” for “Surface transportation research strategic planning” in item 508, and added items 509 and 511 to 513.

§ 501. Definitions

In this chapter, the following definitions apply:

(1) **FEDERAL LABORATORY.**—The term “Federal laboratory” includes a Government-owned, Government-operated laboratory and a Government-owned, contractor-operated laboratory.

(2) **INCIDENT.**—The term “incident” means a crash, natural disaster, workzone activity, special event, or other emergency road user occurrence that adversely affects or impedes the normal flow of traffic.

(3) **INNOVATION LIFECYCLE.**—The term “innovation lifecycle” means the process of innovating through—

- (A) the identification of a need;
- (B) the establishment of the scope of research to address that need;
- (C) setting an agenda;
- (D) carrying out research, development, deployment, and testing of the resulting technology or innovation; and
- (E) carrying out an evaluation of the costs and benefits of the resulting technology or innovation.

(4) **INTELLIGENT TRANSPORTATION INFRASTRUCTURE.**—The term “intelligent transportation infrastructure” means fully integrated public sector intelligent transportation system components, as defined by the Secretary.

(5) **INTELLIGENT TRANSPORTATION SYSTEM.**—The terms “intelligent transportation system” and “ITS” mean electronics, photonics, communications, or information processing used singly or in combination to improve the efficiency or safety of a surface transportation system.

(6) **NATIONAL ARCHITECTURE.**—For purposes of this chapter, the term “national architecture” means the common framework for interoperability that defines—

- (A) the functions associated with intelligent transportation system user services;
- (B) the physical entities or subsystems within which the functions reside;
- (C) the data interfaces and information flows between physical subsystems; and
- (D) the communications requirements associated with the information flows.

(7) **PROJECT.**—The term “project” means an undertaking to research, develop, or operationally test intelligent transportation systems or any other undertaking eligible for assistance under this chapter.

(8) **SAFETY.**—The term “safety” includes highway and traffic safety systems, research, and development relating to vehicle, highway, driver, passenger, bicyclist, and pedestrian characteristics, accident investigations, communications, emergency medical care, and transportation of the injured.

(9) **STANDARD.**—The term “standard” means a document that—

- (A) contains technical specifications or other precise criteria for intelligent transportation systems that are to be used consistently as rules, guidelines, or definitions of characteristics so as to ensure that materials, products, processes, and services are fit for the intended purposes of the materials, products, processes, and services; and
- (B) may support the national architecture and promote—

- (i) the widespread use and adoption of intelligent transportation system technology as a component of the surface transportation systems of the United States; and
- (ii) interoperability among intelligent transportation system technologies implemented throughout the States.

(Added Pub. L. 105-178, title V, §5101(2), June 9, 1998, 112 Stat. 422; amended Pub. L. 112-141, div. E, title II, §2001, July 6, 2012, 126 Stat. 865.)

PRIOR PROVISIONS

A prior section 501, added Pub. L. 90-495, §30, Aug. 23, 1968, 82 Stat. 830, related to declaration of policy as to highway relocation assistance, prior to repeal by Pub. L. 91-646, title II, §220(a)(10), Jan. 2, 1971, 84 Stat. 1903.

Editorial Notes

AMENDMENTS

2012—Pars. (2) to (9). Pub. L. 112-141 added pars. (2) to (7), redesignated former par. (2) as (8), and added par. (9).

Statutory Notes and Related Subsidiaries

EFFECTIVE DATE OF 2012 AMENDMENT

Amendment by Pub. L. 112-141 effective Oct. 1, 2012, see section 3(a) of Pub. L. 112-141, set out as an Effective and Termination Dates of 2012 Amendment note under section 101 of this title.

AUTHORIZATION OF APPROPRIATIONS

Pub. L. 114-94, div. A, title VI, §6002, Dec. 4, 2015, 129 Stat. 1561, provided that:

“(a) **IN GENERAL.**—The following amounts are authorized to be appropriated out of the Highway Trust Fund (other than the Mass Transit Account):

“(1) **HIGHWAY RESEARCH AND DEVELOPMENT PROGRAM.**—To carry out section 503(b) of title 23, United States Code, \$125,000,000 for each of fiscal years 2016 through 2020.

“(2) **TECHNOLOGY AND INNOVATION DEPLOYMENT PROGRAM.**—To carry out section 503(c) of title 23, United States Code—

“(A) \$67,000,000 for fiscal year 2016;

“(B) \$67,500,000 for fiscal year 2017;

“(C) \$67,500,000 for fiscal year 2018;

“(D) \$67,500,000 for fiscal year 2019; and

“(E) \$67,500,000 for fiscal year 2020.

“(3) **TRAINING AND EDUCATION.**—To carry out section 504 of title 23, United States Code, \$24,000,000 for each of fiscal years 2016 through 2020.

“(4) **INTELLIGENT TRANSPORTATION SYSTEMS PROGRAM.**—To carry out sections 512 through 518 of title 23, United States Code, \$100,000,000 for each of fiscal years 2016 through 2020.

“(5) **UNIVERSITY TRANSPORTATION CENTERS PROGRAM.**—To carry out section 5505 of title 49, United States Code—

“(A) \$72,500,000 for fiscal year 2016;

“(B) \$75,000,000 for fiscal year 2017;

“(C) \$75,000,000 for fiscal year 2018;

“(D) \$77,500,000 for fiscal year 2019; and

“(E) \$77,500,000 for fiscal year 2020.

“(6) **BUREAU OF TRANSPORTATION STATISTICS.**—To carry out chapter 63 of title 49, United States Code, \$26,000,000 for each of fiscal years 2016 through 2020.

“(b) **ADMINISTRATION.**—The Federal Highway Administration shall—

“(1) administer the programs described in paragraphs (1), (2), and (3) of subsection (a); and

“(2) in consultation with relevant modal administrations, administer the programs described in subsection (a)(4).

“(c) **APPLICABILITY OF TITLE 23, UNITED STATES CODE.**—Funds authorized to be appropriated by subsection (a) shall—

“(1) be available for obligation in the same manner as if those funds were apportioned under chapter 1 of title 23, United States Code, except that the Federal share of the cost of a project or activity carried out using those funds shall be 80 percent, unless otherwise expressly provided by this Act [div. A of Pub. L. 114-94, see Tables for classification] (including the amendments by this Act) or otherwise determined by the Secretary [of Transportation]; and

“(2) remain available until expended and not be transferable, except as otherwise provided in this Act.”

§ 502. Surface transportation research, development, and technology

(a) BASIC PRINCIPLES GOVERNING RESEARCH AND TECHNOLOGY INVESTMENTS.—

(1) APPLICABILITY.—The research, development, and technology provisions of this section shall apply throughout this chapter.

(2) COVERAGE.—Surface transportation research and technology development shall include all activities within the innovation lifecycle leading to technology development and transfer, as well as the introduction of new and innovative ideas, practices, and approaches, through such mechanisms as field applications, education and training, communications, impact analysis, and technical support.

(3) FEDERAL RESPONSIBILITY.—Funding and conducting surface transportation research and technology transfer activities shall be considered a basic responsibility of the Federal Government when the work—

(A) is of national significance;

(B) delivers a clear public benefit and occurs where private sector investment is less than optimal;

(C) supports a Federal stewardship role in assuring that State and local governments use national resources efficiently;

(D) meets and addresses current or emerging needs;

(E) addresses current gaps in research;

(F) presents the best means to align resources with multiyear plans and priorities;

(G) ensures the coordination of highway research and technology transfer activities, including through activities performed by university transportation centers;

(H) educates transportation professionals; or

(I) presents the best means to support Federal policy goals compared to other policy alternatives.

(4) ROLE.—Consistent with these Federal responsibilities, the Secretary shall—

(A) conduct research;

(B) partner with State highway agencies and other stakeholders as appropriate to facilitate research and technology transfer activities;

(C) communicate the results of ongoing and completed research;

(D) lead efforts to coordinate national emphasis areas of highway research, technology, and innovation deployment;

(E) leverage partnerships with industry, academia, international entities, and State departments of transportation;

(F) lead efforts to reduce unnecessary duplication of effort; and

(G) lead efforts to accelerate innovation delivery.

(5) PROGRAM CONTENT.—A surface transportation research program shall include—

(A) fundamental, long-term highway research;

(B) research aimed at significant highway research gaps and emerging issues with national implications; and

(C) research related to all highway objectives seeking to improve the performance of the transportation system.

(6) STAKEHOLDER INPUT.—Federal surface transportation research and development activities shall address the needs of stakeholders. Stakeholders include States, metropolitan planning organizations, local governments, tribal governments, the private sector, researchers, research sponsors, and other affected parties, including public interest groups.

(7) COMPETITION AND PEER REVIEW.—Except as otherwise provided in this chapter, the Secretary shall award, to the maximum extent practicable, all grants, contracts, and cooperative agreements for research and development under this chapter based on open competition and peer review of proposals.

(8) PERFORMANCE REVIEW AND EVALUATION.—

(A) IN GENERAL.—To the maximum extent practicable, all surface transportation research and development projects shall include a component of performance measurement and evaluation.

(B) PERFORMANCE MEASURES.—Performance measures shall be established during the proposal stage of a research and development project and shall, to the maximum extent possible, be outcome-based.

(C) PROGRAM PLAN.—To the maximum extent practicable, each program pursued under this chapter shall be part of a data-driven, outcome-oriented program plan.

(D) AVAILABILITY OF EVALUATIONS.—All evaluations under this paragraph shall be made readily available to the public.

(9) TECHNOLOGICAL INNOVATION.—The programs and activities carried out under this section shall be consistent with the transportation research and development strategic plan under section 6503 of title 49.

(b) GENERAL AUTHORITY.—

(1) RESEARCH, DEVELOPMENT, AND TECHNOLOGY TRANSFER ACTIVITIES.—The Secretary may carry out research, development, and technology transfer activities with respect to—

(A) motor carrier transportation;

(B) all phases of transportation planning and development (including construction, operation, transportation system management and operations, modernization, development, design, maintenance, safety, financing, and traffic conditions); and

(C) the effect of State laws on the activities described in subparagraphs (A) and (B).

(2) TESTS AND DEVELOPMENT.—The Secretary may test, develop, or assist in testing and developing any material, invention, patented article, or process.

(3) COOPERATION, GRANTS, AND CONTRACTS.—The Secretary may carry out research, development, and technology transfer activities related to transportation—

(A) independently;

(B) in cooperation with other Federal departments, agencies, and instrumentalities and Federal laboratories; or

(C) by making grants to, or entering into contracts and cooperative agreements with one or more of the following: the National Academy of Sciences, the American Associa-