Reno-Tahoe Airport Authority

DECEMBER 2018

Reno-Tahoe International Airport
MASTER PLAN

Mead&Hunt

Reno-Tahoe Airport Authority

DECEMBER 2018

Reno-Tahoe International Airport
MASTER PLAN

Mead&Hunt

in association with

Gensler
Unison Consulting
Trillion Aviation
Arora Engineers, Inc.
MSA Engineering Consultants
KPS3
Webber Air Cargo
ECORP
Traffic Works
Q&D Construction
Center for Regional Studies, College of Business, University of Nevada, Reno
Faith Group, LLC

Contents

CHAPTER 4 AIRPORT ALTERNATIVES

CHAPTER 5 FINANCIAL FEASIBILITY ANALYSIS AND FACILITIES IMPLEMENTATION PLAN

Acronyms

AC Advisory Circular
ACRP Airport Cooperative Research Program
ADG Airplane Design Group
ADO Airports District Office
AGL Above Ground Level
AIP Airport Improvement Program
AIRS Aerometric Information Retrieval System
ALP Airport Layout Plan
ALS Approach Lighting System
AMSL Above Mean Sea Level
AOC Airport Operating Certificate
AOPA Aircraft Owners and Pilots Association
APV Approach Procedure with Vertical Guidance
ARC Airport Reference Code
ARFF Aircraft Rescue and Firefighting Facility
ARTCC Air Route Traffic Control Center
ASV Annual Service Volume
ATC Air Traffic Control
ATCT Airport Traffic Control Tower
AVGAS Aviation Gasoline
BCA Benefit Cost Analysis
BMP Best Management Practice
CAP Civil Air Patrol
CBD Central Business District
CFR Code of Federal Regulations
CIP Capital Improvement Program
CTAF Common Traffic Advisory Frequency
dB Decibel
DNL Day-Night Noise Level
EPA Environmental Protection Agency
FAA Federal Aviation Administration
FAR Federal Aviation Regulations
FBO Fixed Base Operator
FCT FAA Contract Tower
GA General Aviation
GDP Gross Domestic Product
GMA Growth Management Act
GQS Glidepath Qualification Surface
GPS Global Positioning System
HIRL High Intensity Runway Lights
IAP Instrument Approach Procedure
IFR Instrument Flight Rules
ILS Instrument Landing System
IMC Instrument Meteorological Conditions
INM Integrated Noise Model
LIRL Low Intensity Runway Lights
LITL Low Intensity Taxiway Lights
LOI Letter Of Intent
LOS Level of Service or Line of Sight
LPV Localizer Performance with Vertical Guidance
MALS Medium Intensity Approach Lighting System
MALSR Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
MAS Missed Approach Segment
MIRL Medium Intensity Runway Lights
MITL Medium Intensity Taxiway Lights
MTOW Maximum Takeoff Weight
NAAQS National Ambient Air Quality Standards

NAS National Airspace System

NASA National Aeronautics and Space Administration

NAVAIDS Navigational Aids

NCDC National Climatic Data Center

NDB Non-Directional Beacon

NEPA National Environmental Policy Act

NHPA National Historic Preservation Act

NM Nautical Mile

NOAA National Oceanic and Atmospheric Administration

NPIAS National Plan of Integrated Airport Systems

NRCS National Resources Conservation Service

NRHP National Register of Historic Places

OCS Obstacle Clearance Surface

ODALS Omnidirectional Approach Lighting System

OPBA Operation Per Based Aircraft

PAPI Precision Approach Path Indicator

PCA Permit Compliance System

PVC Poor Visibility and Ceiling

RCL Runway Centerline Lighting

REIL Runway End Identifier Lights

RNAV Area Navigation

RNP Required Navigation Procedure

ROFA Runway Object Free Area

RPZ Runway Protection Zone

RSA Runway Safety Area

RTR Remote Transmitter/Receiver

RVR Runway Visual Range

SEL Sound Exposure Level

TACAN Tactical Air Navigation

TAF Terminal Area Forecasts

TDZ Touchdown Zone

TERPS United States Standard for Terminal Instrument Approach Procedures

TOFA Taxiway Object Free Area

TRACON Terminal Radar Approach Control

TSA Transportation Security Administration

TSS Threshold Siting Surface

UNICOM Universal Communications

USDA United States Department of Agriculture

USFWS United States Fish and Wildlife Service

VFR Visual Flight Rules

VLJ Very Light Jet

VMC Visual Meteorological Conditions

VOR Very High Frequency Omnidirectional Range

VOR/DME Very High Frequency Omnidirectional Range with Distance Measuring Equipment

VORTAC Very High Frequency Omnidirectional Range/Tactical Air Navigation

Glossary of Terms

Above Mean Sea Level. The elevation of an object above the average sea level.

Air Carrier. A commercial airline with published schedules operating at least five round trips per week.

Aircraft Operation. An aircraft arrival (landing) or an aircraft departure (takeoff) represents one aircraft operation.

Aircraft Rescue and Firefighting Facility. A facility housing specifically trained personnel and equipment in response, firefighting, hazard mitigation, evacuation, and rescue of passengers and crew of an aircraft involved in a ground emergency.

Airport Layout Plan. The official, FAA approved drawing of an airport's existing and proposed facilities.

Airport Reference Code. An FAA design criteria based upon the approach speed (represented by a capital letter) and wingspan (represented by a roman numeral) of an aircraft that produces a minimum annual itinerant operations per year at an airport.

Airport Traffic Control Tower. A central operations tower in the terminal air traffic control system with an associated IFR room if radar equipped, using air to ground communications and/or radar, visual signaling, and other devices to provide the safe and expeditious movement of air traffic.

Air Route Traffic Control Center. A facility providing air traffic control to aircraft on an IFR flight plan within controlled airspace and principally during the enroute phase of flight.

Air Traffic Control. The control of aircraft traffic in the vicinity of airports from control towers, and in the airways between airports from control centers.

Annual Service Volume. A reasonable estimated of an airport's annual capacity (i.e., the level of annual aircraft operations that will result in an average annual aircraft delay of approximately one to four minutes).

Approach Lighting System. Radiating light beams guiding pilots to the extended runway centerline on final approach and landing.

Boarding Load Factor. The ratio of aircraft seats available for passenger boarding compared to the number of passengers actually boarding.

Federal Aviation Regulations. The rules and regulations that govern the operation of aircraft, airways, airmen, and airports.

Fixed Based Operator (FBO). A facility on an airport providing various services for aircraft such as maintenance, fuel, storage, etc.

Fleet Mix. The mix or differing aircraft types operated at a particular airport or by an airline.

General Aviation. Civil aviation excluding air carriers, commercial operations, and military aircraft.

Glide Slope. An angle of approach to a runway established by means of airborne instruments during instrument approaches, or visual ground aids for the visual portion of an instrument approach and landing.

Global Positioning System. A satellite-based radio positioning, navigation, and time-transfer system.

Instrument Approach. A series of predetermined maneuvers developed for the orderly transfer of aircraft under instrument flight conditions, from the beginning of the initial approach to a landing, or to a point from which a landing may be made visually.

Instrument Flight Procedure. Procedures developed by the FAA to guide aircraft to airports including distance, topography, elevation, coordinates, angle of approach, and missed approach procedures.

Instrument Flight Rules. Rules specified by the FAA for the flight under weather conditions in which visual reference cannot be made to the ground and the pilot must rely on instruments to fly and navigate.

Instrument Landing System. A precision instrument approach system that normally consists of a localizer antenna, glide slope antenna, outer marker, middle marker, and ad approach lighting system.

Instrument Meteorological Conditions. Weather conditions that require that pilots rely primarily on instrumentation for navigation under IFR, rather than by visual reference and VFR.

Itinerant Operation. An aircraft landing or takeoff that originates at one airport and terminates at another (place-to-place).

Knots. A measure of speed used in navigation. One knot is equal to one nautical mile per hour (1.15 knots – 1 mile per hour).

Landing Minimums. Prescribed altitudes and visibility distances that the pilot uses to make a decision as to whether or not it is safe to land on a particular runway.

Local Operation. An aircraft landing or takeoff that remains in the local traffic pattern (i.e. training or touch-and-go operation).

Level of Service. A measure that determines the quality of service provided by transportation devices, or transportation infrastructure, and is generally linked to time and speed of the vehicles.

Load Factor. The percentage of seats occupied on an aircraft by passengers.

Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights. A medium intensity approach lighting system providing a visual lighting path for landing pilots, consisting of nine light bars with five steady burning white fixtures, five sequential flashing white fixtures, and a threshold bar of 18 steady burning green fixtures.

National Plan of Integrated Airport Systems. Established by the Airport and Airway Improvement Act of 1982, it is the identification of national airport system needs including short- and long-term development costs.

Nautical Mile. A measure of distance used in air and sea navigation. One nautical mile is equal to the length of one minute of latitude along the Earth's equator, officially set as 6,076.115 feet.

NAVAID. Navigational aid, which is any facility providing assistance or aid to pilots for navigating through the air.

Non-Directional Beacon. A NAVAID providing signals that can be read by pilots of aircraft equipped with direction finding equipment, used to determine bearing and can "home" in or track to or from the desired point.

Omnidirectional Approach Lighting System. An approach lighting system consisting of five sequential flashing omnidirectional lights extended along the runway centerline and two located on either side of the runway threshold.

Precision Approach Path Indicator. A visual navigational aid providing guidance information to help pilots acquire and maintain the correct approach (in the vertical plane) to a runway.

Runway. A strip of pavement, land, or water used by aircraft for takeoff or landing.

Runway Object Free Area. A defined two-dimensional surface centered on a runway providing enhanced safety for aircraft operations by having the area free of objects protruding above the runway safety area edge elevation, except for objects that need to be located within the area for air navigation or aircraft ground maneuvering purposes.

Runway Safety Area. A defined surface surrounding a runway prepared or suitable for reducing the risk or damage to aircraft in the event of an undershoot, overshoot, or excursion from the runway.

Runway Visual Range. Facilities providing a measurement of horizontal visibility located adjacent to instrument runways.

Tactical Air Navigation. An enroute navaid combining azimuth and distance measuring equipment into one unit and operated in the ultra-high frequency band.

Taxiway. A designated area that connects runways with aprons, providing the ability to move aircraft on the ground so they will not interfere with takeoffs or landings.

Taxilane: The portion of the aircraft parking area used for access between taxiways, aircraft parking positions, hangars, storage facilities, etc.

Terminal Airspace. The airspace controlled by a terminal radar approach control facility.

Terminal Area. A general term used to describe airspace in which approach control service or airport traffic control service is provided.

Terminal Radar Approach Control. An FAA air traffic control service to aircraft arriving, departing, or transiting airspace controlled the facility.

Very High Frequency Omnidirectional Range. A ground based electronic navigation aid transmitting navigation signals for 360° oriented from magnetic north.

Very High Frequency Omnidirectional Range/Tactical Air Navigation. A ground based electronic navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance measuring equipment at a single site.

Visual Approach. An aircraft approach conducted under IFR, which authorizes the pilot to proceed visually and clear of clouds to the airport. The pilot must, at all times, have either the airport or the preceding aircraft in sight.

Visual Flight Rules. Rules that govern the procedures for conducting flight under visual meteorological conditions.

Visual Meteorological Conditions. Weather conditions under which pilots have the ability to visually see and avoid stationary objects and other aircraft and fly without the use of instrumentation, under VFR.

INTRODUCTION

The Reno-Tahoe Airport Authority (RTAA) owns and operates the Reno-Tahoe International Airport (RNO or Airport). The RTAA launched a comprehensive update of the Airport Master Plan (Plan) in October 2016. The Plan addresses the future of RNO in the context of socioeconomic changes occurring in the Northern Nevada and Lake Tahoe region, along with an evolving aviation industry and regulatory environment.

The RTAA completed RNO's previous Airport Master Plan in 1991. Since the 1991 study, many smaller, targeted studies have addressed other specific Airport issues. Recent and lasting changes to the region and within the aviation industry have made this the appropriate time to take a comprehensive look at the Airport's potential for the future.

The Nevada State Demographer shows 2.2 percent population growth in the Reno-Sparks Metropolitan Statistical Area (MSA) since 1991. The most recent July 2015 official population estimate for the MSA is 445,930, which represents a 1.2 percent increase for the same period in 2014. Since 2010, the Reno-Sparks MSA population growth rate has hovered between 1.0 percent and 1.4 percent. Within Washoe County, annual population growth rates have averaged 2.9 percent from 1991 through 2007, with a few years reaching upwards of nearly 4 percent growth. Beyond the Reno-Sparks MSA, the population of the 10 counties that make up the Airport's service area grew by approximately 0.7 percent compared to the 2015 Reno-Sparks MSA growth rate of 1.2 percent.

The 2016 estimates by the Nevada State Demographer anticipate a continued growth rate of 1.2 percent annually in the short-term population projections (2015-2020) for the Reno-Sparks MSA and Northwest Nevada area, which translates into approximately 5,000 to 6,000 persons each year. **Chapter 1 – Inventory of Existing Conditions**, provides additional demographic information.

Northern Nevada has begun to diversify into a center for emerging manufacturing, research, and technology. Millennials, or those born between 1982 and 2004, make up the fastest growing segment of the workforce and play a significant role in determining the region's future housing, employment, communication, and transportation needs. The Northern Nevada and Lake Tahoe region continues to define itself as a destination for world-class outdoor activities, entertainment, and industry.

Local governments and the private sector have responded to these changes and subsequent needs through the construction of new housing, recruitment of major employers, and investments in communication technologies and transportation infrastructure. Tesla Motors has committed to an investment of up to $5 billion for the development of a "gigafactory," which is anticipated to support thousands of new jobs. Fiber optic cables, installed by Switch along Union Pacific's "Overland Route," pass through Reno and Sparks and serve as a primary digital and fiber optic highway for internet traffic in the U.S. The fiber optic highway allows companies such as AT&T, Level 3, Qwest, and Verizon to support the development of data centers for several major technology companies, including Apple, Switch, and eBay. Combined, these data centers are expected to contribute $2.5 billion of investment into the region.

The commercial airline industry experienced several changes since 1991. Security measures increased because of September 11, 2001. Passengers have fewer choices due to airline consolidation (e.g. fewer flights, destinations, and airlines to choose from). Cell phones developed into the primary communication device and travel tool for travelers. Ticket costs evolved through add-ons such as checked baggage and seat selection fees. The availability of transportation network companies continues changing how travelers access the airport. Dramatic shifts in oil prices since the recession of 2008 mean higher costs for passengers as average airline fares continue to increase. Similarly, due to the competition among legacy and low-cost carriers, passengers are more willing to travel greater distances before reaching an airport to obtain less expensive fares. Despite these changes, 2015 passenger numbers at RNO show they are starting to recover from the 2008/2009 recession, and the Federal Aviation Administration (FAA) projects that national passenger enplanements will exceed one billion passengers per year before 2030.

The air cargo industry also experienced significant changes since the recession of 2008. Unprecedented fuel costs forced several former major all-cargo carriers such as BAX Global, Emery Worldwide, and Kitty Hawk to ground freighter aircraft, to be acquired, or go into bankruptcy. During the same period, DHL withdrew service from the US domestic market and began concentrating entirely on the international market. As of 2016, more than 90 percent of total domestic annual freight from RNO is flown by FedEx and UPS and the majority of belly cargo is flown by Southwest Airlines. According to Airport Consultants International North America's (ACI-NA) 2015 US air cargo rankings, RNO places 54th for total volume for air cargo handled. Total air cargo handled at RNO has increased by approximately 35 percent since 2009.

Changes also occurred in the general aviation industry following the recession of 2008/2009. From 2005 to 2015, total general aviation operations declined by an annual average of 1.7 percent per year. Despite this overall decline, corporate general aviation and flight training continue to grow as business travelers respond to less frequent commercial flights, and the airlines tackle pilot shortages, while recreational pilots have cut back on flight hours. Older aircraft are being retired and replaced with a sophisticated new generation of general aviation aircraft, complete with state of the art navigation and communication equipment.

The use of unmanned aerial systems (UAS) or drones within the US is an emerging technology that will be considered as part of the Plan. The benefits of UAS are wide ranging but need to be carefully evaluated as they may have an impact to airport operations in the future.

The regulatory environment has evolved, and FAA Advisory Circulars, guidance standards, and regulations on airport design and operations, are updated regularly. These updates from the FAA increasingly emphasize simplifying airfield geometry and meeting design standards, which influence airfield layout and design. The aviation industry continues to adapt to changing environmental regulations, reducing the impacts from aircraft and airport operations. New types of fuel, satellite navigation procedures, and more efficient and quieter engine technology will further reduce some of the negative consequences associated with aircraft operations.

The Plan will serve as a 20-year guide for facility improvement and development at RNO, while also supporting RTAA goals and objectives. A robust analysis of historical trends and regional sensitivity to economic boom and bust will form the basis recommendations on how the Airport can develop and grow, while supporting safe, efficient, and financially and environmentally sustainable operations and providing a high level of customer service.

The sections that follow provide additional detail about the Plan, the process, and the ultimate deliverable.

What is an Airport Master Plan?

An airport master plan is a comprehensive study of an airport that usually focuses on short-, medium-, and long-term development plans to meet future aviation demand. The vitality of air transportation as a community industry makes it important that requirements for new, improved, or expanded airport facilities be anticipated in planning. The scope of an airport master plan focuses on identifying the development and facilities needed to support an FAA-approved forecast.

Many elements of airport operations and management are outside of the scope of this Plan, such as staff organization, marketing, and general repair and maintenance. The Plan focuses on facilities that serve passengers, air cargo, aircraft owners, pilots, and Airport tenants and provides guidance on how the facilities need to be updated and changed to maintain a high level of service to the flying public into the future.

What the Plan "is"

- A long-term development plan for the Airport over the next 20 years,
- A detailed and comprehensive data analysis of existing conditions and future trends,
- A Plan with a focus on long-term facility development and land use,
- A document assembled through extensive community outreach, and
- A flexible, living document that will serve the Airport for years to come.

What the Plan "is not"

- An engineering level document,
- A rigid "blueprint" for future development,
- A program to move the Airport to another location,
- A business, strategic, or marketing plan, or
- An environmental permitting document.

The Plan is one of several documents produced by the RTAA that guides Airport operations. The Plan development considers the other documents already in place and refers to these documents as appropriate.

Master Plan Elements

The Plan is organized into six core elements that translate into comprehensive chapters as the plan is developed. Each element is a building block that results in the final Plan document. The purpose behind each element is described below.

- **Inventory:** This element answers the question, "What do we have?" This element describes facilities and levels of activity currently existing at the Airport, and how they have changed over time. The inventory is the foundation of subsequent Plan elements.
- **Aviation Forecasts**: This element answers the question, "How much demand do we expect?" Understanding future demand is a critical part in the decision-making process that occurs during Plan development, and the execution of the ensuing capital improvement plan. The forecasts look at the volume of passengers and cargo, the number of based aircraft, and the movements of aircraft to describe how the use of the Airport will change over time. Aviation forecasts are pivotal in justifying future improvements and helping the FAA determine funding priority. For these reasons, the FAA must approve the aviation forecasts. This is one of only two Plan elements that the FAA formally approves.
- **Facility Requirements and Demand / Capacity Analysis**: This element answers the question, "Are our existing facilities sufficient to meet future demand?" This element can be thought of as a gap analysis between the facilities that the Airport has (inventory) and the facilities it will need (based on the forecasts). This element will yield recommendations on which facilities need improvement, expansion, replacement, and removal and will provide an idea of the scale of facility changes needed to meet future demand. This element will also address the potential for Airport modernization to address evolving technologies and preferences.
- **Airport Alternatives and Environmental Considerations**: This element answers the question, "How will we meet future demand?" This element builds on the recommendations in the Facility Requirements and Demand / Capacity Analysis element, and assesses a variety of alternatives to meet future needs. Alternatives are evaluated based on cost, environmental impact, construction feasibility, and operational integration with the existing airfield and facilities. A preferred alternative for each facility type is recommended based on the analysis and carried forward in the Plan.
- **Financial Feasibility Analysis and Facilities Implementation Plan**: This element answers the following questions: (1) "When do we need to build them?"; (2) "How will we pay for these improvements?"; and (3) "What is the affordability and the potential rates and charges impact on airline costs servicing RNO?" The preferred alternatives are plotted on a timeline of when they are expected to be needed, based on the forecasts. A financial plan is prepared that addresses up-front capital costs, ongoing operations and maintenance costs are identified, and the financial impact and feasibility are evaluated. The outcome of this element is a phased capital improvement plan that will guide the RTAA through the facility development process.
- **Airport Layout Plan Set with Exhibit 'A'**: This element is the graphical depiction of the preferred improvements identified in the Plan. This document shows how the airfield will look once the improvements have occurred and illustrates the conceptual ultimate plan. This is the second part of the Plan that must be formally approved by the FAA. Only improvement projects depicted on an approved Airport Layout Plan are eligible for FAA funding.

Public Involvement is a process that occurs constantly throughout the development of the Plan. The purpose of public involvement is to include Airport stakeholders and other interested parties in the process of developing the Plan. The process allows questions and concerns to be addressed early in planning and is intended to make the Plan reflect the goals and objectives of the stakeholder community the Airport serves. Public involvement for this Plan includes a Master Plan Working Group (MPWG) made up of key stakeholders; open houses for the public; a project website; newspaper, TV news, and website posts; social media outreach; and targeted stakeholder group interviews.

The MPWG consists of local tenants, airline representatives, air traffic control staff, and local stakeholders. The group meets at seven key project milestones and helps guide the Plan, so the product reflects local goals and objectives. The purpose of the MPWG is to provide information to the project team, communicate with respective stakeholders, act as a sounding board for study recommendations, provide high level review of the plan elements, give feedback on established project goals and objectives, and promote public participation during public information meetings.

Project Vision

The project vision sets the stage for why the RTAA is undertaking the Plan and is the basis for the established goals and objectives. The Plan's ultimate success will be determined by how well the process and recommendations met the vison, described below:

> **The Plan project vision is to provide an achievable, flexible, fiscally, and environmentally responsible road-map that will help ensure that Reno-Tahoe International Airport can accommodate future activity levels, further its position as a domestic and international gateway, and support regional economic development initiatives.**

Project Goals and Objectives

RTAA has specific goals and objectives for the Plan from an organizational perspective. As shown in **Figure I-1**, the goals and objectives reflect the project vision and the high level of service the RTAA wants to provide to the traveling public.

Figure I-1: Project Goals and Objectives Diagram

- **Stakeholder Input:** RNO is an essential public facility and Airport development is intended to occur in line with community needs. The Plan should reflect the community. This will be achieved by providing ample opportunities for stakeholders to interact with the project team, become informed on key plan elements and decisions, and share their opinions with the RTAA.
- **Safety and Security:** The overarching goal of any airport operator is to provide safe and secure facilities for the traveling public, staff, and those who live and work nearby. Improvements recommended in the Plan will undergo a safety management system (SMS) evaluation to address any elements that would compromise safety and security as the plan is implemented.
- **Economic Viability:** Preserving the long-term economic viability of the Airport is a primary goal. The Plan will include a financial capacity analysis to determine the Airport's current financial condition. This analysis helps to determine what level of capital spending is affordable based on an airport operator's strategic financial goals and objectives. The results will provide guidance on maintaining an affordable climate for the Airport, the Airlines and its partners.
- **Enhance the Customer Experience:** The Plan has a focus on the customer experience, looking at facility improvements to make travel more enjoyable. The Plan will consider how customers use the Airport facilities from the moment they arrive on property to the moment they leave. Alternative evaluation will consider how changes will improve the overall customer experience.
- **Environmental Stewardship:** Recommended facility improvements will be evaluated based on their impact to the environment. Plan goals will build on the RTAA's environmental goals and objectives and incorporate airport industry best practices. Improvements will seek to minimize environmental impacts in terms of nature and the community.
- **Optimize Facility Utilization:** The Plan will evaluate the efficiency in how Airport facilities are used and provide recommendations to use facilities differently for greater efficiency. The goal is to make the best use of what currently exists through operational and capital improvements before substantial investment in new facilities. Achieving this goal will help the RTAA control costs while still providing a high level of customer service.
- **Realistic Aviation Forecasts:** Forecasts will drive decision-making in the Plan and for years to come. Forecasts are developed by industry experts, reviewed by the RTAA and its Airport stakeholders, and ultimately will be accepted by the FAA as reasonable projections of aviation activity. Realistic forecasts will help scale future improvement projects so that a high level of service can be provided without costly overbuilding.
- **Future Flexibility:** Aviation is a dynamic industry, and the future is uncertain. One of the most important elements of a 20-year plan is flexibility. The Plan will strive to avoid predicting changes but provide recommendations with enough flexibility that the RTAA can continue to adapt despite rapid technological and socioeconomic development.